PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

SHAD AND RIVER HERRING MANAGEMENT BOARD

Webinar
August 4, 2020

Approved February 4, 2021

Proceedings of the Shad and River Herring Management Board Meeting Webinar
August 2020

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1. **Approval of Agenda** by Consent (Page 1).

2. **Approval of Proceedings of October 2019** by Consent (Page 1).

3. **Move to accept the 2020 American Shad Benchmark Stock Assessment and Peer Review Report for management use** (Page 27). Motion by Pat Keliher; second by Cheri Patterson. Motion carried (Page 27).

4. **Move to task the Technical Committee with identifying for the Board potential paths forward to improve shad stocks given the results of the stock assessment** (Page 28). Motion by Pat Keliher; second by Emerson Hasbrouck. Motion carried (Page 30).

5. **Move to approve the state proposals for shad and river herring management as presented today** (Page 38). Motion by Lynn Fegley; second by Spud. Woodward. Motion carried (Page 39).

6. **Move to approve New Hampshire's request for an exemption from their River Herring SFMP requirement to close the fishery in 2020 based on data indicating that passage counts for the most recent three-year average did not meet the sustainability target of 72,450 fish. This exemption is based on explanatory information supporting the claim that passage counts are low due to equipment failure and other variables, rather than true fish passage numbers** (Page 39). Motion by Cheri Patterson; second by Roy Miller. Motion carried (Page 40).

7. **Move to elect .Justin Davis as Vice Chair of the Shad and River Herring Management Board** (Page 42). Motion by Raymond Kane; second by Dennis Abbott. Motion carried (Page 43).

8. **Motion to adjourn** by Consent (Page 43).

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ATTENDANCE

Board Members

Megan Ware, ME, proxy for P. Keliher (AA)
Sen. David Miramant, ME (LA)
Cheri Patterson, NH (AA)
Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Mike Armstrong, MA, (Chair)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Phil Edwards, RI
Eric Reid, RI, proxy for Rep. Sosnowski (LA)
Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
Robert LaFrance, CT, Governor Appointee proxy
Maureen Davidson, NY, proxy for J. Gilmore (AA)
Emerson Hasbrouck, NY (GA)
John McMurray, NY, proxy for Sen. Kaminsky (LA)
Joe Cimino, NJ (AA)
Heather Corbett, NJ, Administrative proxy
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, Legislative proxy (Chair)
Kris Kuhn, PA, proxy for T. Schaeffer (AA)
Loren Lustig, PA (GA)
G. Warren Elliott, PA (LA)
John Clark, DE, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Lynn Fegley, MD, proxy for B. Anderson (AA)
Russell Dize, MD (GA)
Allison Colden, MD, proxy for Del. Stein (LA)
Pat Geer, VA, proxy for S. Bowman (AA)
Chris Batsavage, NC, proxy for S. Murphey (AA)
Mel Bell, SC, proxy for P. Maier
Malcolm Rhodes, SC (GA)
Ross Self, SC, proxy for Sen. Cromer (LA)
Doug Haymans, GA (AA)
Spud Woodward, GA (GA)
Jim Estes, FL, proxy for J. McCawley (AA)
Rep. Thad Altman, FL (LA)
Marty Gary, PRFC
Bryan King, DC
Dan Ryan, DC, proxy
Derek Orner, NMFS
Sherry White, US FWS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Ken Sprankle, Technical Committee Chair
Mike Bailey, Stock Assessment Subcommittee Chair
Pam Lyons Gromen, Advisory Panel Chair

Staff

Bob Beal
Toni Kerns
Caitlin Starks
Maya Drzewicki
Kristen Anstead
Max Appelman
Tina Berger
Pat Campfield
Lisa Havel
Chris Jacobs
Jeff Kipp
Sarah Murry
Kirby Rootes-Murdy
Mike Schmidtke
Geoff White

Guests

Fred Akers
Seth Amgott
Bill Anderson, MD (AA)
Pat Augustine, Coram, NY
Michael Auriemma, NJ DEP
Joey Ballenger, SC DNR
Carolyn Belcher, GA DNR
Peter Benoit, Ofc. of Sen. King, ME
Jacque Benway, CT DEP
Dave Bethoney, CFR Foundation
Alan Bianchi, NC DNR
Jason Boucher, DE DFW
Rob Bourdon, MD DNR
Jeff Brust, NJ DFW

Guests (continued)

Twyla Cheatwood, NOAA
Benson Chiles, Chiles Consulting
Doug Christel, NOAA
Jeremy Cox, *Bay Journal*
Sen. Ronnie Cromer, SC (LA)
Jim Cummins, ICPRB
Curtis Dalpra, ICPRB
Jeff Deem, Lorton, VA
Mari-Beth DeLucia. TNC
Lyndon DeSalvo, TNC
Wes Eakin, NYS DEC
Sheila Eyler, US FWS
Jared Flowers, GA DNR
Matt Gates, CT DEEP
Shaun Gehen, Gehan Law
Emily Gilbert, NOAA
Lewis Gillingham, VMRC
Angela Giuliano, MD DNR
Zoe Goozner, Pew Trusts
Zack Greenberg, Pew Trusts
Jon Hare, NOAA
Carol Hoffman, NYS DEC
Kyle Hoffman, SC DNR
George Jackman
Rusty Hudson
Desmond Kahn
Patrick Keliher, ME (AA)
Alexa Kretsch, VMRC
Phil Langley, Dameron, MD
Chip Lynch, NOAA
John Maniscalco, NYS DEC
Genine McClair, MD DNR
Jason McNamee, RI (AA)
Steve Meyers
Mike Millard, US FWS
Chris Moore, MAFMC
David Mussina
Brian Neilan, NJ DFW
Ken Neill, Yorktown, VA
George O'Donnell, MD DNR
Ian Park DE DFW
Nicholas Popoff, US FWS
Bill Post, SC DNR
Alexei Sharov, MD DNR
Melissa Smith, ME DNR
Gregory Sorg, SC DNR
David Stormer, DE DFW
Kevin Sullivan, NH F&G
John Sweka, US FWS
Helen Takada-Heumacher, FL FWS
Hannah Welch, UNE
Holly White, NC DENR
Chris Wright, NOAA

The Shad and River Herring Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Tuesday, August 4, 2020, and was called to order at 8:30 a.m. by Chair Michael Armstrong.

CALL TO ORDER

CHAIR MICHAEL ARMSTRONG: Good morning everyone. I would like to open the Atlantic States Shad and River Herring Management Board. I'm Mike Armstrong from the Commonwealth of Massachusetts, your Chair. We've got a few things to cover today, the main ones being the review of the benchmark shad assessment and considering state proposals to resolve inconsistencies.

APPROVAL OF AGENDA

CHAIR ARMSTRONG: We have a decent length of time, so I think we can probably get through all this stuff without killing ourselves. But we'll move right along. You all have a copy of the agenda. Are there any changes, additions that anyone would like to see? Are there any hands, Toni?

MS. TONI KERNS: No hands.

CHAIR ARMSTRONG: All right, seeing none, the agenda is approved by consensus.

APPROVAL OF PROCEEDINGS

CHAIR ARMSTRONG: You have the proceedings from October, 2019, any revisions necessary?

MS. KERNS: I don't see any hands.

CHAIR ARMSTRONG: Seeing none the proceedings are approved by consensus.

PUBLIC COMMENT

CHAIR ARMSTRONG: At this point we will solicit public comment, and again as we always say, items that are not going to be discussed later, so things on the assessment or state proposals to resolve inconsistency are not what we want to hear right now. Does anybody have a public comment on something other than things on the agenda?

MS. KERNS: Just a reminder to the public, you need to raise your hand by pushing the hand button if you want to speak. If you're having trouble with that you could shoot us a question or a chat. Mike, I don't see any hands raised.

CONSIDER ACCEPTANCE OF THE 2020 SHAD BENCHMARK STOCK ASSESSMENT

CHAIR ARMSTRONG: In that case, we'll forge on, which brings us to Consideration of the 2020 Shad Benchmark Stock Assessment. This is an actionable item. At the end of all this we will need to accept the assessment and the review for management purposes.

PRESENTATION OF THE STOCK ASSESSMENT REPORT

CHAIR ARMSTRONG: The first is the Presentation of the Stock Assessment Report, and that is by Mike Bailey. Take it, Mike.

DR. MICHAEL BAILEY: This is Mike Bailey from the U.S. Fish and Wildlife Service. I served as the Chairman for the benchmark stock assessment. I have about a 20-minute presentation, so I'll get started. The 2020 American Shad Benchmark Stock Assessment, here is our favorite fish just to start off.

Just for a brief outline, we're going to go through the stock structure, talk about life history information, and some of the data we collected, the assessment methods and methodology, and then we'll talk about the stock status and the conclusions from this benchmark. Stock structure, we had about 104 unique rivers, stocks from river beds. Out of those about 23 systems we actually had information to start the assessment.

Each individual river was considered its own stock, because of natal homing and some genetic differences. We used three regional meta-populations to share life history information. The species has a cline of iteroparous versus semelparous, and we use that as part of the breakup. Otherwise, this was work based on genetic information.

We have the northern iteroparous population, which is north of the Hudson River up to the Canadian Border and beyond. We have a southern iteroparous population north of the Cape Fear River up to the Hudson River, and then a semelparous from the Cape Fear River down to Florida. All of those fish only spawn once and then die, as opposed to the iteroparous fish, which will spawn more than once.

We did use some coastwide meta-population analysis for mixed stock datasets, including coastwide trawl samples, and some other samples in which we simply don't know which stock those fish are coming from. I'll just show you a series of slides. These are actually slides of river systems we use in the habitat modeling sections.

All of the red dots are dams on those river systems. This is the northern iteroparous section, where we have data from the Merrymeeting Bay, Merrimack, and Pawcatuk in Connecticut. This includes most of the southern iteroparous populations, so fish that spawn more than once but less than north.

We have down from the Hudson, down to the Neuse River. From the Cape Fear River down to St. Johns River, we consider these all semelparous populations, in which they spawn once and then die after spawning. For a life history snapshot, we looked at growth. We used a Bayesian hierarchical von Bertalanffy growth model.

Again, when we didn't have great data in any particular river system itself, we were able to share within those three larger grouping sections that we just talked about. We shared within their metapopulations. We did look at climate, and looked at climate at sea to see how the changing temperatures at sea could change the maximum size and growth, according to some climate projections going out to 100 years.

For natural mortality we used the Then estimator, which is an update of Hoenig 1983, which was used in the previous stock assessment. That is looking at natural mortality based on the maximum age of any given population of fish. The maximum age was 13 for northern and southern iteroparous populations, and for the semelparous populations it was a maximum age of nine, both giving different natural mortalities. The maturity schedule, we looked at Ogives, which is how often fish are going to come back, and at what age they come back to the river. To get a better idea, we used a slightly different methodology there, looking at the number of virgin-spawners, so the first time the fish came back, and then used the natural mortality estimators to look at how often they would come back in the future.

We did not use looking at spawning checks, which was used in other assessments, because our spawning checks for American shad we didn't have a whole lot of faith that those were great checks of when fish actually came back. We had very little data from fish at sea, so with shad some rivers have good estimates of YOY, young of year, when they're still in the river.

But then you don't hear from them again until they come back to the ocean, or they come back to the river to spawn. We have some big gaps at sea, which we'll mention numerous times during the stock assessment. For data indices of abundance, we had 21 fisheries dependent surveys and 65 fisheries independent surveys.

Some of those surveys were young of year indices within river. We had several run-count indices, in which from either fish ladders or fish ways, and then we had a lot of CPUE, so catch per unit effort surveys. Just as an example, here is the Hudson River young of year survey, looking at larger populations back in the '80s and '90s to the points where we are today in which the index is significantly smaller.

We have some catch data, although with the closure of some fisheries we have a little bit less catch data than we've had in previous stock assessments. We have system-specific commercial data landings when possible. We have total mix commercial landings, both U.S. and Canada. The histogram on the right is

all reported U.S. Commercial landings, both riverine and ocean.

We have pretty limited recreational catch for the entire time series, so we don't know how to use that for much at all. The plot with the error bars is American shad total incidental catch and discard catch from the late '80s to 2017. Just a note on that. Midwater trawl fleets were included starting in about 2005.

Age compositions of fish, especially for shad comes up a lot. It's difficult to age shad. We have about 18 datasets representing 12 different systems, so we have several systems that have both scales and otoliths. Otoliths are generally better for determining age. You do have to sacrifice the fish to get those otoliths out.

Spawning check marks were imprecise, more imprecise than age data, and they were not used in the assessment for very much, except for some very minor issues. If you look at the figures, those are the CVs from comparing scale age estimates to known age fish. On the left in otolith estimates the known age fish on the right.

You can see the coefficient of variation for otoliths is much smaller. That more precise data gives us an idea that those otoliths are much more precise, and better to use. Some scale reading can be used, and it can get to a pretty tight coefficient of variation, although not all the time, certainly not as often as otolith ages. Habitat was something that we tried to tackle with this benchmark, to a higher degree than it had been done in the past. We looked at the riverine habitat area. This was based largely on expert opinion, and with GIF models looking at the idea of how big of a river shad are looking for.

What we did was we looked at historic habitat prior to barriers put in. We looked at currently unobstructed habitat, and then we ran kind of the pre-dam, post-dam, we ran some population models to look at some of the population size and estimates of fish that we don't have coming back because of the lack of habitat.

That is something that I think we've put a lot of work into for this benchmark, and it really took a lot of hands to lift that, so I appreciate showing some of the habitat work. That is kind of what we have for data for the assessment methods, how we went about it was we did multiple different things, one of which was looking to power analysis.

When I'm talking about that I'm talking about kind of the signal versus the noise. We were able to look at abundance datasets, and look at trends over time periods. Through that power analysis we were able to look at, hey will you be able to see a change if a change occurs, looking at kind of your baseline data you've been collecting, and the variation about that?

We were able to evaluate uncertainty, and provide a basis for improvement to monitoring programs. The big question there is, are you collecting good enough data that you'll actually be able to see if there is a change? Another thing we did was trend analysis. We used Mann-Kendall for detecting trends in abundance, mean lengths, and mean lengths at age.

We also used ARIMA models to compare recent abundance to reference abundance points. Those Mann-Kendall abundance trends time period at a certain start year and then moving forward, the ARIMA kind of our change of abundance set was 2005, 2005 was when the coastwide ocean intercept fishery was closed.

You'll see in the results we used 2005 as kind of that change point, to see when we expect to start seeing changes. The assessment methods, again we did a per recruit analysis. We used estimates of spawning potential under various total mortality levels, relative to baseline spawning potential, so kind of our baseline mortality there.

We provided reference points for total mortality, using a Z percent. Most of those data inputs there were life history information for any particular river. We selected Z40 as a threshold for American shad mortality. That total mortality results in 40 percent of

spawning stock biomass per recruit of natural mortality.

But Z40 is more conservative than the threshold used in previous assessments, which was Z30. The more conservative threshold is appropriate, given published simulation analysis. Really, a big part of that is the data poor characterization for many American shad stocks, and the uncertainty in the resilience of the species due to many different anthropomorphic impacts. I've used total mortality estimators catch curves, to get an idea of abundance, of mortality, I'm sorry. Estimates of total mortality were based on the decline of abundance across subsequent age classes. The data input for these models were mostly age compositions. We were able to compare the Z threshold reference points to determine mortality status. We used the last three years, so 2015, '16, and '17 of those Z estimates to compare, to see if we had sustainable or unsustainable mortality. This is an example of using the Hudson River spawning stock Haul Seine Electrofishing Surveys, to look at instantaneous mortality over time, to see if it's above or below that Z line.

We also use a delayed difference model, which is a biomass dynamics model that allows for a lag in recruitment to exploitable biomass. We had some extra help with having some experts on this model in the peer review, which helped us change this a bit from how we originally had it to post peer review, we got some better answers from using the delayed difference model.

Estimates of exploitation time series, so fishing and exploitation resulting in maximum sustainable yield, which is what we compared to. The inputs for this model were catch, index of abundance, and life history information, and again we applied the stocks with active fisheries to determine the mortality status from those last three years of data we used, the 2015, '16, and '17, to indicate mortality.

We were able to for the first time with shad, use a statistical catch at age model for two systems, the Albemarle Sound and the Potomac River. These were more advanced models that in the past we haven't had good enough data to use. It's a forward projecting population model that estimates recruitment, spawning stock biomass, and mortality.

It integrates the comprehensive suite of data, and can separate mortality from direct anthropomorphic stock removal. These removals can include fishery removal, and fisheries plus. In terms of the Potomac they also have a brood stock program, which removes (last word broke up). We were able to look at that as well.

The data inputs are, again this is a hungry model, it needs a lot of data. We used index of abundance, total catch at age composition, and life history information. This estimates the per recruit reference points internally, including the spawning stock biomass-based reference points for model estimate recruitments.

Again, we're using that Z40 to look at if it's sustainable mortality, and looking at the spawning stock biomass indicate that it's a depleted stock or an overfished stock. That was just a quick background. I will say this is a large document, and there is a lot of information in it. I'm just trying to touch on some of the highlights.

Looking at the results, the power analysis is signal versus noise assessment. This is going to be an important tool for fisheries managers to allow for future planning and sampling. Folks will be able to look at that and see if there are current samplings, with the current variability about that sampling is going to actually allow them to see if there is a change, in which we've set some of the change, what we're looking for in the model.

This is something that I think a lot of folks are going to go back after looking at this, and decide hey, are we sampling correctly? Do we need to augment our sampling? Do we need to do more? Do we need to do less? That is something we're happy that's going to be a tool for fisheries managers to use. You know our abundance trend, again the power analysis, about 57 to 65 indices were unable to detect trends over 10 years if the threshold would be set. Again, this is an opportunity to reevaluate. Are you going to be able to

see trends with your current data collection systems, and how should you change those?

Some of the adult trends, since 2005 we had 4 increasing trends, 0 decreasing trends. This is from the Mann-Kendall. Eleven with no trends, and 7 with conflicting trends, so a lot of variation since that 2005 benchmark kind of threshold we set to look at changes over time. The young of year indexes, again pretty mixed up and down trends.

Most of them with no trends, or datasets that don't have enough data to give us a trend. There is no consistent response in coastwide metapopulation abundance after that ocean intercept fisheries were closed in 2005. We were able to get some abundance status trends as well. The Hudson stock is depleted, so this is a qualitative determination for the Hudson, and a coastwide metapopulation based on historical landings, and indices of abundance.

When we had historic lands and indices of abundance, we felt like we could get the status of an individual river system. The Albemarle Sound determination was based on comparison of projected per recruit reference points and model estimator's recruitment. That was not overfished.

One thing to note is only adult mortality levels could be determined from the available data. We don't have young of year indices in any of our rivers to get good enough ideas of juvenile mortality. Three stocks are experiencing unsustainable adult mortality, those are the Connecticut, the Delaware, and the Potomac.

All three of these stocks are managed according to management programs, sustainable fisheries plans. Five stocks are experiencing sustainable adult mortality. The Hudson you'll notice, we've already talked about it as depleted. Although they're having sustainable adult mortality, they're under recruitment failure. I just wanted to mention that, a little misleading there.

A bunch of these rivers are under sustainable fisheries management plans, the James, York, and Rappahannock are under a bycatch plan. One thing we did note here when it comes to mortality status, is although we have three stocks that are experiencing unsustainable adult mortality, that is not necessarily fishing mortality.

That may be under other types of mortality, not simply F, but the other is anthropometric adult mortality that is probably featuring into those factors. For habitat assessment and simulation modeling, this is what I mentioned before in some of the methodology. We were able to get expert opinion and GIS modeling, get into a situation in which we can look at the first set up there is spawning runs with Habitats 1, Habitat 2, Habitat 3.

Those are just different units in an undammed river, and we have population models that can look at that scenario of all the river being opened. The next setup there is a dammed river, in which there is no passage at all. We can look at the habitat section that has no dams on it, and no increased mortality from upstream or downstream mortality at this dam. Then we have our current set up, which is the third scenario here, in which we have Habitat 1, before a dam. We have an idea of how many fish can be there, and then we model looking at pretty positive passageways to look at how those fish move up and down.

That is kind of our current state modeled throughout the coast, to get an idea of how many fish come up and down there. With that habitat assessment simulation modeling, the current is modeled with very optimistic upstream and downstream passage. At the rate of about 50 percent upstream passage per dam of all the dams, 80 percent passage downstream to adult, and then juveniles have a 90 percent survival as well.

Those are optimistic from a lot of the empirical datasets out there. The simulation analysis showed habitat restrictions are a major impediment to spawning potential, and that optimistic passage scenarios only offer modest gains in spawning potential. With those, the current setup we still have very limited and reduced spawning potential.

The dams that there is optimistic passage only gives about a 4 percent increase in the spawning potential. I know this is very small, but maybe some of you can point out your favorite river here, and we can see some of these. The black bars are the current available area downstream of the first dam, and the white bars are the total potential for the river, and that is based on our GIS estimate of habitat to look at.

The historic habitat prior to anthropomorphic barriers is certainly much higher. Currently there is a lot of rivers with a lot of obstructed habitat. Now 45 percent of the historic habitat is currently obstructed. Again, this was a lot of work put in by expert opinions on some good modelers that really gave us the first step back look at habitat for a lot of this on a coastwide basis.

You can see some of those white bars are quite large, meaning that there is a lot of habitat that is no longer available for shad. The conclusions, habitat loss due to barriers are likely restricting positive response in the coastwide metapopulation abundance. We have poorly characterized additive mortality because of dams.

We have many situations in which as a group we were debating looking at fishing mortality, and saying how much of this is fishing versus how much of this is habitat and dam related. Our Fs and our Zs started to blend together, which was difficult, and we talked about quite a bit in the assessment.

Habitat access is leading to a reduction of ability. Fish could be harvested either commercially or recreationally. I think habitat is the key to this benchmark stock assessment. Adult mortality was determined to be unsustainable for some system-specific stocks, indicating continued need for action to reduce adult mortality.

We need to have the ability to decouple fishing; recreational, commercial, and bycatch in other anthropomorphic causes. Juvenile mortality during the life stage in the ocean between leaving the river and coming back mature adults is simply unknown. Even in cases where adult mortality is determined to be sustainable, overall stock sustainability can be compromised if juvenile mortality is too low. We still have a black box at sea out there, that we don't have a good idea of all the juvenile fish, and the fish that have already spawned once and go back out to sea that just don't do that.

The assessment doesn't rule out bycatch impacts on stock response, but it does provide a definitive link between stock trends and bycatch level, at which again there is a lot of uncertainty in that bycatch in fact. Looking forward, that unknown juvenile mortality is still a major limitation that we need a lot more information about.

There is almost no information collected as I mentioned on those juvenile fish. Another aspect of stocks at sea are mixing, and we don't have a good idea on if we do sample juveniles at sea, to understand which stock they're coming from. That stock composition data is essential to improving assessment of American shad.

We now have since the last stock assessment moving forward, we have much better genetic baselines that will allow for some of those juvenile samples collected at sea to be brought back to a natal river, with a lot of work that could be done. That is something that before the last stock assessment it was impossible, but now we're moving up to that phase.

The Stock Assessment Subcommittee just kind of wanted to throw some names out there. I could point to everyone and say what they've done, but that would take up a good chunk of the day. It was a pretty dedicated group that did a lot of work for this benchmark, and I'm pretty happy with the results.

Certainly, all the Tech Committee and some people came in and came out over the time period. I'm sure I left some people out. But this is kind of other folks to thank as well. One thing that we did reach out and ask for some short timelines on was that expert opinion on habitat modeling, so we appreciate that.

We were also able to get some information on Canadian stocks, which we previously hadn't gotten to the great got. Those were some great things moving forward. Again, ASMFC staff did a lot of work on preparing the actual report. Those large documents are nothing fun to wrestle with, and we appreciate that quite a bit. That concludes this for the big overview of the shad benchmark.

CHAIR ARMSTRONG: Thank you, Dr. Bailey. I think what we're going to do at this point is forego questions, and hear the Peer Review Report first. But before doing that I would like to thank the Committee from the Board. That is quite a tome you guys created, and it's just a stunning amount of work by dozens and dozens of people. We would like to thank you for the effort.

I mean, you know with striped bass you're assessing the stock, actually two stocks. With this you're doing 23 separate stock assessments, an amazing amount of work. Thank you for everything you've put into it, and the whole crew on that.

PRESENTATION OF
PEER REVIEW PANEL REPORT

CHAIR ARMSTRONG: Before questions, I would like to bring up Dr. Karin Limburg to prevent the Peer Review of this assessment. Dr. Limburg.

DR. KARIN LIMBURG: Hey, Dr. Armstrong, how are you?

CHAIR ARMSTRONG: I'm good, how are you?

DR. LIMBURG: I'm okay, on the fringe of the hurricane. I was told I would be able to show my own screen, so I'm hoping that the magic is happening. Good morning everybody, and good morning, Commissioners and good morning to all the other folks here. I thought I would be on camera, so I actually put on my favorite fish shirt, which if you use a little imagination they look like shad.

Anyway, we'll just go with the PowerPoint here. This is actually my fourth peer review sharing, and I've done American shad before, actually. Let me just put this into show mode. I hope all of you can see this okay. If you do have questions, you guys can either ask afterwards, I think that is probably the most efficient way to do it.

I like this image from Denton, I think his name was Charles Denton, was a marvelous artist, and created many, many, very nice fish prints. I think the shad one is one of the finest, of course I'm biased. Just for background, I did my P.H.D. work at Cornell, in a period of pretty good shad abundance. I studied the young of year, actually, and they're moving out of the system. I know shad reasonably well.

This is what the team looks like, the faces here. We had a really interesting group of folks. Craig and I, I think you would say are more or less pure fish ecologists. Jamie, Mark and Quang are modelers. Jamie is kind of also gets out in the field quite a bit too. I think Mark may as well. That is a microphile. That is a real trophy morale that I'm holding in my hand, not to compete with Craig over there with his salmon.

But the three in the middle are from the west coast, Jamie and I are east coast. I'll also point out that Jamie and I, I think are the only two people around from any of the parties who were there before, including I think the Commissioners, who were involved with the stock assessment in 2007. Jamie and I are the institutional memory of that.

Because of that I've put in a little bit of comparisons with previous assessment. The process of assessment, we had this new one. This was the first assessment since 2007, so 13 years later. We had the first virtual peer review workshop, so we were on Go to Meeting for most of a week doing this, and I would say it went pretty well.

It's not quite the same as face to face in person, but next best, I guess. The review that we did looked at the data inputs, the model results, and all those kinds of things, and the overall quality of the assessment. Mike rightly pointed out that this was a monster assessment. It is really a credit to the dedication and

the hard work and qualities of the team of the stock assessment team that put this together.

I want to give you guys a little bit of context on this. I heard something that nowadays is sort of forgotten. I don't know what you Commissioners think about this, but the American shad was the number one fish, aside from cod, through much of American history. In fact, it was so important that in the 1800s it was one of the top if not the top, species of fish that was developed in aquaculture, because it was such a desirable fish. As it says here, it stands in very high, if not among the head of luxuries which our rivers afford. This is the first article in the transaction of the American Fish Cultural Association, which was renamed the American Fisheries Society, which is the world's largest professional association of fisheries biologists and managers, and everybody else.

It was really a tremendously important fish, and it's kind of been forgotten now, because of the phenomenon that you may have heard of called the shifting baseline. Whereas, as populations decline over time for one reason or another, we humans are very adaptable, and start moving on to other things, and so it sort of gets forgotten.

The question is, you know, so these are data which Mike Bailey also showed from just fisheries catches, so of course the catch statistics may be driven not just by the abundance of fish, but by people's preferences and other factors; weather and so on. But there is a remarkable trend in here, I think, and this, five-year trend line sort of smooths it out and you can sort of see.

Can you guys see my arrow on the screen? It shows, what we're seeing here are almost like stanzas, where this is sort of leveling down. Although I can't definitively say it's because there are fewer fish. We are very likely at historic lows of American shad, or they are moving north is a possibility too.

But the thing that really gives me pause is, and I was tipped off really by Jim Cummins who I saw is attending here today too. He is a tremendous historian of the Potomac, and he had pulled together some data for the 2007 assessment, which showed that the Potomac was actually very full of shad in the early 1800s.

If we plot those data, what I'm showing is something that is normalized from, or sort of standardized to landings per river kilometer. What we can see is that the baseline of 1950, or the '60s and '50s, is so much less than just one river in the early 1800s. We have a rough idea that we are in a very different regime now.

Where our changes are today are almost unnoticeable when you scale it up to what was here historically. I also want to point out that shad back in the 1940s, when this National Geographic article came out, were reasonably larger than they are today too. I mean we can show some nice pictures of big shad, but they're really not like they used to be.

That is also something that comes out in the assessment report. Overall, the Peer Review accepted and passed the assessment. I wanted to just get that up front, as we did in 2007. These are the terms of reference that we have, what I call the marching orders. We were asked to evaluate the choice of the stock structure.

I assume that these are fairly standard, or more or less standard terms of reference. Looking at the thoroughness of the data collection, how all the various data were used and treated and presented. The methods and biological reference points, the models of which there was an abundance of models. Then for each document we were asked to look at the best, and make recommendations on best estimates of biomass, abundance exploitations. For management, although we sort of said that a lot of this was probably, we would be hesitant to use all of it for that. But if possible, just by alternative estimation methods. Then also, examine the choice of reference points and the methods that we used to determine them, and then look at the stock status determination. Then also, finally, review the whole set of recommendations that were provided by the Technical Committee. Then make any additional

recommendations as well. I'm not going to be able to get through all of them in this talk, in this presentation. The TC and the Review Panel both made a number of recommendations.

The Technical Committee had a whole slew of them, it's a great list, and then we added to that as well, which all of these are in the report. I wanted to show you, this is something I showed in 2007. This was to show what kinds of data were being used at that time. I think they actually assessed, broke the system up into something like 30 stocks instead of 23 that time.

What you should see here is that there is a lot of blanks. There is a lot of exes, which are unreliable data or deemed unreliable, and there were many fewer black dots of things that were used, which were mainly from commercial fishery data or adult data. There was some juvenile abundance information too, but really it was sort of sparse.

There was some information on dams, but that was sort of more or less a footnote. The kind of information that was available then was not, you know one of the things that the Technical Committee and Stock Assessment Committee knew at the time was that this was not a stellar dataset. I think that perhaps the shad and river herring folks since then have been laboring under a feeling of not having enough. Now, I think they have actually got quite a lot.

Then to compare that to today. Yes, there are some blanks in here, but some of them are because there just aren't fish passage facilities on a lot of these systems, so there is no way to count things on a facility that doesn't exist. But there is a little more data. Datasets are much improved from before.

I want to make that point, because I think the states have really been putting in effort on this, and that's very commendable. No system has everything. I guess that is something we want to strive for. I can also point out that age determination, which is kind of a fundamental thing we need for understanding a lot of processes in the biology and natural history of shad, as was basically most other fish species.

We see that mostly there are a lot of esses in this column, S stands for scale, and scales are just not generally as easy to use to determine age of fish as their otoliths. As Mike Bailey pointed out, otoliths, you have to kill the fish to use them, but they are definitely better. It happens to be one of my very arcane skills to do a lot of work with otoliths. If you look me up, you'll see a lot of my recent work is on a lot of otolith work.

These are just some pictures so that you get a feel for what we're talking about here. Here are some scales, these are some scales of American shad on the left. What you can see here, as I pointed out with the arrows, are spawning sets, and those are actually made because the scales actually have some calcium in them, and as the fish are running up the rivers they are probably mining the calcium out, and the scales actually erode. There may be other reasons why they erode too, but that is certainly one of them.

Now they'll erode and then get kind of raggedy, and then as they go back out to sea and they feed and grow some more. The scales start putting on new growth, and they lose that check, which is actually very nice, and it reads out like logbooks right, so we've got sort of an idea. Each fish is sort of telling the story of its life.

Then otoliths as I said are a lot easier to use to age shad, although they are not completely easy. I would say that the clarity of the rings, which you can sort of see here in this image, do get clearer as you head northward. It probably has some kind of a temperature thing. As you look at them further south, they are kind of muddier to look at, trust me I've looked at them.

But you can get age information and my own specialty is to examine chemical composition of otoliths too, and we can get a huge amount of very interesting information from the chemistry as well, although still a research brunt in many cases. But we can use them for example, we can look at in many, many systems we can look at the strontium that is imbedded in the

calcium carbonate of the otoliths, and get a very clear idea of their movement in and out of salt water.

You can look at migration histories that way. I wanted to talk a little bit about what I call the modeling and statistical universe here, because there were really almost a dizzying number of models that were used in this analysis. If we're looking at abundance and size at age, those kinds of thing.

There was a suite of things that they run through. Power analysis is a statistical technique to ask, is the size of the change in the data big enough to see it over just background statistical noise. If that was the case, they could look at the auto aggressive integrated moving average type model, the ARIMA model, which is a time series technique to see if there are trends.

As Mike said, they were specifically using those to assess the changes since 2005, which was the last real ASMFC action mandate to stop the offshore directed fisheries, so they're asking that. Then also, they used what is called a nonparametric technique, the Mann-Kendall to ask more or less palliatively, have the trends been up or down.

Those datasets that were used, some of those extended back quite some time, so that they were of variable length. For biomass, the amount of tissue that is produced out there. They were looking at different ways of doing it. If there was no age structure data, or if it wasn't so good, they employed these Delay-Difference models, which Mike discussed.

Otherwise they used models that could take advantage of age structure, and they fall in a class called the Thompson-Bell Spawner/Recruit. How many spawners are produced per recruit. For total mortality, they employed a technique called catch curves. Some people don't like them, or some experts don't like them, but they are very, very often used, and I will say that the Stock Assessment Committee used them very carefully, and assessed them very carefully. I think they went the extra mile to assess them by looking at different ways of calculating them, for example. If you have really data rich information for river stocks, including fishing data, then they could go forward with these so-called age structured assessment models as well, and Mike also talked about those.

That's what I called kind of the universe. As we were reading through the entire report, you know you have to sort of bear in mind that there are these many moving parts of it. Then on top of that, there were two new modeling approaches, which haven't been even considered, I think, in the previous assessment at all.

These, I think, are probably the result of the thinking and the mood from the 2007 assessment. One was that inland habitat modeling, which Mike eluded to, looking at the impact of dams on the systems, and the other was to try to address the ocean-mix stock. The fisheries in particular, although I threw in this shark to remind us that shad are, of course, subject to natural phenomena like predation as well.

We're not the only mouths out there going for fish. I also wanted to summarize the findings, and I wanted to compare nowadays findings for the status of your stocks again. The 1998 benchmark, which was reported on in the 2007 assessment and also just for comparison, and then also the 2007 itself.

What we have are hopefully the symbols that make it somewhat clear. Things that are sort of yellow are kind of stable, things that are green smiley faces are sustainable and increasing, and then the sad faces are declining, or unsustainable. Question marks mean not determined. What we see is that for the 2007, things were looking kind of mmm, not necessarily so great. I think this certainly puts some caution into people, as they went forward.

Then in '20, now 13 years later, the status was broken up into two items, the total mortality and the abundance. What we can see is that total mortality, I made some of these smiley faces a little smaller, and shaded them a little bit less red, because these indicate that the assessment showed that the total

mortality was unsustainable in only the most recent years, which was one of the things that the Committee looked at, versus longer term.

We have many systems where we just don't still know what that is like. The Hudson I want to point out is listed as having sustainable mortality, but I've put it sort of a little smaller with a slightly paler shade of green, because honestly, the population levels are very, very low right now. I think that it's indicating I think that it's stable.

But as has been said, the Hudson's abundance is depleted, so I've put a crying face on here instead being the system I know the best. Really the only other assessment that we have, as was mentioned before was for abundances is that the Albemarle Sound from the modelers was not overfished.

The other systems, again a tremendous amount of unknown, and it does make me kind of just as stepping back and asking. Well, here we know more about these dots than ever, and yet we still can't make these determinations. I'm not really sure why that really is, but it is something again to think about. Just the findings that we had. We accepted the choice of stock structure. It seems pragmatic. Now we know that the shad spawn in many systems. They mostly have a lot of fidelity to a natal river, like the salmon do. They do some straying, but not as much as they do homing. We think that the choice was good, and for some of those complex systems particularly in the south, where there are many rivers that come out in embayment's and things like that.

The choices of how to group them was good. Evaluating the thoroughness of the data collections, this is a quote from our report. "Our Review Panel was very impressed (and a little overwhelmed) by the amount of data available for assessing American shad stocks." The datasets were comprehensive and thorough.

There was an acknowledged weakness on the part of the Stock Assessment Subcommittee, as you saw before, that many states used scales to age their samples, and we recommend as they did the use of otoliths. I think all states are now collecting otoliths. You know I don't want to beat on this too much, but it's knowing how fish age, what that composition is, is quite important, for at least the current way that the assessments are carried out.

The models really do depend on knowing age. I can just say that I work also in the Baltic Sea on cod over there. They are in such bad shape from really low oxygen problems in the Baltic Sea, and other problems too, that they don't even lay down good rings on their otoliths anymore. We're using other methods to tease out the age from the otoliths, instead of looking at rings.

Evaluating the models and so on, we were impressed by the number of analytical methods. As I said, there was sort of a dizzying number of methods that were used. We did find that the analyses were complementary too. For the trends, the trends will be followed up, of course, as we go into the future.

It was recommended that from the more advanced time series analyses could be used. Instead of just looking at ARIMA models, you could use other types that would remove sort of any kind of temporal trends, like an uptick from, you can separate out those to see the ups or downs from the other wiggles in the data, and look at the other wiggles, just putting it simply.

Their techniques go, such as Dynamic Factor Analysis that look for underlying factors, so for instance there may be some climate driven factors, or something else within a large region, like one of the metapopulation regions. Those could be employed too. The Committee found that the Thompson-Bell biomass per recruit model wasn't a good model for semelparous stock, it was designed for these recruit spawner stocks.

The other models were deemed to be appropriate, but as Mike mentioned, the Delay-Difference model was modified by one of the experts on the Panel. Kerne actually developed some of these models, and

so he helped them, helped the Committee to explore alternate assumptions, and add more diagnostics. That was quite useful.

The Catch Curve, we agreed with the Subcommittee that it is very impractical to split fishing from total mortality. I guess you've heard now from both Mike and myself about the other mortality that happens because, fishing is one factor in the suite of factors that lead to shad dying. It's difficult not to keep them together, I guess to split that out. We discussed the biases in the current method. Jamie Gibson in particular proposed an alternative that appropriates information from spawning history. He was very keen on that. That is also in our report, but I don't have time to go into it in detail.

Then for the age structured model, these are definitely the most advanced models that were used. The only systems that really had enough data to conduct these models was the Potomac and the Albemarle Sound, and they were fully explored with various types of analyses and diagnostics. The Review Panel had three recommendations.

One was that one of these models, the simpler versions of these so-called statistical catch at age models broke down, because they didn't account for the availability of shad to actually be caught. Basically, what they were doing was catching fish that shouldn't have been caught, because they didn't separate out mature fish from immature fish.

This does actually get into something else, which is that immature fish are assumed to remain in the ocean, and not run with the mature fish into the rivers, where they can be caught. I know from my own work that that is not always the case, at least I've studied one-year old fish, and I know that they go back a lot of times with the spawners.

We don't know how many, what fraction of the population it is, but we do know that we can find them coming up in the ocean. I think it's a nuanced issue that probably bears more research, and also to run simulations under different assumptions of fishing and biomass. Again, getting at this question of where are the immature fish?

If they use one of these more advanced models, the stock synthesis model, they could model the immature fish separately from the mature fish, or even better would be to have a shad-specific model, assessment model. This would of course take more time, because it would require more data. It would require better estimates of spawning marks.

Getting the idea of like how many times do these fish actually go up into the rivers. That again, it's a long-term goal. It's a very good goal, and I think it would be something that would be wonderful to have some P.H.D. students work on. The habitat modeling, we were impressed with this analysis.

We thought that this perked the whole assessment up to a different level, and we think it's necessary for diadromous fishes. We've seen, having often shared the reviews of American eel and river herring in 2012, the fishery came up then too. But we were told, well you can't really do much about it, because the only thing that fisheries managers can manage is the fishing level.

But we actually think that this is something that can be used, that we now have this information, and we can say, we or the ASMFC Commissioners can make strong recommendations to other stakeholders to remove dams when it's possible. I think there is just a growing body of evidence that dam removal is probably the best thing for improving the sustainability of diadromous fishes, or not to build them in the first place, which is going on in other parts of the world. I think that is a very important finding that comes out of this, and I do encourage you to consider that. The ocean mix stock modeling, the report noted that the results were extremely variable, the datasets are very variable. But the Review Panel thought that the approach that was used was the most appropriate. It was an expert from NOAA Fisheries who conducted that analysis, and the Panel felt that the estimates would improve with better monitoring of ocean fisheries.

One point I want to make is that shad really connect the dots. All these diadromous fishes connect the dots between the watersheds and the open ocean. From the headwaters, which influence a lot of the water's dynamics and the land use, and the damming, and so on, the pollutants that go in all the way out to the sea.

These fish are real connectors, and you know if you can manage them sustainably and well, it means I think that we're dealing with some of our problems in a more appropriate way. For the estimates of biomass, abundance and exploitation, we felt that this was by and large done well. We did make the point that the Delay-Difference model is not designed to be used on semelparous stocks.

We also agreed that the total mortality being highly variable, or the estimates of certainty are not very certain. Wide confidence intervals means that that is the case, and have to be a somewhat a little bit "grain of salt" on this. For reference points, we appreciated the many ways that were done for assessing so many populations and locations.

Where status was undetermined, there was still an awful lot of information that was really informative. I would be reading along in these various river chapters, and think wow, this is really an amazing amount of data, and then at the end they would say, status is unknown. I think that they are probably close to being able to say something in many of the systems.

But I think the Subcommittee was hesitant to make a concrete determination often. For their recommendations, there were just many, many. One I'll just point out myself, because I think about this in the context of the Hudson, although not all these predators are in the Hudson. But young of year, Mike Bailey said that very little is known about young of year.

I kind of question that, because there are so many Masters and P.H.D. studies that are focused on shad and river herring, I think. It's really getting some of that information really incorporated into stock assessments may be where the gap is. But one of the things that I'm increasingly aware of in the Hudson is that we have a suite of really novel introduced predators.

They have been introduced either by moving in through connected waterways, like the Eerie Canal connecting from the Great Lakes over into the Mohawk River, which is a tributary to the Hudson, or through introductions, which are the case with things like the channel cat and the blue catfish on top, which were introduced as sportfish in the south, and are moving their way up. The channel cat actually prefers to eat select from alosine herring as prey.

Up north we have more pike, we see more pike, and then of course the nasty looking face there is the snakehead, which is making its way through parts of the range as well. Just one of the threats. But there are other things, there are many, many, other things that we have recommendations for. All of them are to get an idea of what these fish are doing in their ecosystems. But from sort of the small scale, fine scale genetics on up to their role in these systems. The other thing to mention is just that we also can't forget that climate change is moving right along. Although this panel comes from the Stock Assessment Report, and I would have really like to have seen us go back to the earlier decades, because then you'd really, really see the changes.

These are catches as seen from the NOAA Fisheries. When you see the changes in the dynamics of where the shad are being caught has really moved northward. I think John Hare, who is on this call I think, and Janet Nye and their colleagues have studied this quite a bit, looking at how many stocks of fishes are moving northward, and shad is certainly one of them.

The Committee used climate projections, the BAU stands for business as usual projection, and then with some mitigation, some climate mitigation, looking at the impacts of rising temperatures on the parameters of shad growth. Even with mitigation we're going to see declines, and as I mentioned we're already seeing some declines.

Whether those are directly from you know the sort of metabolic task of rising temperatures making fish respire more and grow less, or if it's a change in the food web or some combination. It's likely to be there. It really means that we have to be more precautionary. It doesn't mean we should shut down fisheries, where they can be prosecuted.

But we just have to think about it more. It's more like, I work on ocean deoxygenation it's one of my research topics. There our recommendations are that for coastal systems that are subject to dead zones that management really has to take care, really take care of nutrient management, so as not to exacerbate that problem.

It's the same thing here. We just really have to think about it more holistically. For shad and shad fisheries to be sustainable going forward, we do need to think in that broader context. The watersheds to the sea I'm very glad to see in this report, and climate change, which I'm glad to see in this report, and continued improvements to monitoring and data.

Don't wait, please don't wait another 13 years for the next benchmark assessment. We've discussed how that could be, the timeframe could be shortened up and maybe split apart to ease the burden on the Committee. Thanks for listening to this part of the presentation. I just wanted to end with saying that shad is an important, important fish.

We forget so often about it, but it's one of my rites of spring. That's John Waldman in the picture, we were fishing in the Delaware this spring, where it's legal to take home fish. I cooked up some shad roe, which is absolutely awesome, and smoked some shad as well, which is totally awesome too. If you have questions, I'll do my best to answer. Thanks for listening.

CHAIR ARMSTRONG: Karin, thank you so much. That was a great review. But the best part is, I just heard you volunteer for a Review Panel shorter than 13 years from now. That's awesome, we'll just pencil it in. If the assessment is daunting, the review is just as daunting. It appears you had a great panel to work with. The advice coming out of there is fabulous, and particularly your historic and high-level overview of shad, very, very helpful. You know the perspective, we're at very low levels, even though we look at some runs and say, hey we're doing good. We're really not doing good across the board. We have a lot to think about coming out of this. Our first task will be to consider accepting the assessment and the review for management and use. In preparation for that I would like to open up the floor for questions for Mike and Karin, and Board comments on the assessment from the Board. The floor is open.

MS. KERNS: You have questions from Marty Gary, Justin Davis, and then Loren Lustig. Mike, I think you should also know we have questions from members of the public, just as an FYI for later.

CHAIR ARMSTRONG: Okay, and we'll cover that when the Board members are done. Marty Gary.

MR. MARTIN GARY: Thank you, Dr. Bailey and Dr. Limburg for both all of your hard work, and also two really spectacular presentations. I understood I think most of it, so that was a good highlight for me. I appreciate everything you put into bring this forward to us today. I have two questions. If either of you want to try to respond to them it would be appreciated.

Just a little bit of context. Dr. Limburg, you applied a green smiley face to the Potomac back in 2007. For folks listening and members of the Board, a lot of that I assume is attributable to our fishery dependent bycatch CPUEs, which showed a trend of ever-increasing abundance of American shad in the Potomac.

Every year I look forward to getting the new index values updated, and media calls coming in. Amongst all the other challenges we have that was one of the bright spots. Now we have this assessment to shed some new light. I heard Dr. Bailey say that the Potomac had unsustainable adult mortality, but it may not be attributed strictly to fishing mortality, which

could either be as I understand it, from the bycatch fishery we have, our gillnets and pound nets, or the brood stock collection.

For folks on the Board, PRFC typically issues somewhere between six and eight scientific collecting permits to collect broodfish, which are strip spawned and then taken to hatcheries for restoration efforts in other rivers. This typically happens just down from Mt. Vernon and Monticello, hence the "founding fish" and the importance too of shad in the Potomac, but certainly the eastern seaboard.

But my questions are, and just one other item. We also, Dr. Limburg, you mentioned in one of your last slides predators. I think a lot of folks know we have a huge biomass of invasive blue catfish in the Potomac. It just so happens the epicenter of their distribution overlaps with where shad spawn, and presumably where the juveniles are using habitat in their early life stages.

I guess the first question I have, and maybe it will be speculative in your answer is, what do you think is contributing to this unsustainable adult mortality in the Potomac, specifically? I know some of the research that's been done in the Potomac and in the Chesapeake show that predation on the alosine by blue catfish has not been that significant. But I can't help but believe, given the biomass we have, it's having a significant impact on them. I guess the second question, and it may spill over into our management response dialogue, is the efficacy of the continuity of that bycatch in our fishery dependent collection of data. Where is the value of that going forward, if there is any? Again, sorry for that long series of dialogue leading up to those questions, but again, thank you so much for your presentation, and I'll listen.

DR. LIMBURG: Mike, do you want to start off?

DR. BAILEY: I think to start off, I would introduce Jeff Kipp, who worked on some of the Potomac specific models. We may tag-team that question. There were a bunch of different parts to it. I'll start off by talking about the catfish, and there was a recent paper that came out looking at the two different, I think blue and the flathead, and showing that while the abundance was higher for the blue, the flatheads seemed to really focus in on alosine as a preferred.

They may have had less numbers, but they were looking for alosines more, which may be more problematic than just large numbers. It's probably a big mix there. But certainly, we did include that, because it is an important component. I think with that I'll just kind of hand it off to Jeff, to talk a bit more about the Potomac model.

MR. JEFF J. KIPP: Just to touch on that research Mike cited on the catfish, the invasive catfish species. It did find that blue catfish are more opportunistic, and so their diet tends to be more proportional to the abundance of prey species in the river. You know take that into mind, as shad abundance would increase it would become a bigger component of the blue catfish diet.

If you look at the trends in abundance that we have, so we have some young of year indices, and some adult indices in addition to what Marty mentioned in the CPUE index. You can see a very clear increase in shad abundance in the early 2000s. Then those increases tend to level off. If you look at the trend analysis on the indices of abundance in the assessment, there were no trends detected since 2005.

But if you look over the full time series of those indices, which go back into like the '80s or early '90s, they did find increases in abundance. That is mostly attributable to those ramp ups that occurred in the late '90s and early 2000s, but have since leveled off. You know it could be potentially blue catfish are taking advantage of that increase in abundance that occurred in the early 2000s.

But in addition to that, the only other sources of mortality that we know of there going into the adult mortality estimates out of the age composition data, are bycatch mortality, and then the brood stock mortality. You know we recognize that those brood

stock fish are taken for the purpose of improving recruitment and raising those fry. But they don't get the chance to repeat spawn, as Marty mentioned they're sacrificed.

They don't have the opportunity to come back, so they contribute to some of that adult mortality. But in addition to that there is the nebulous additional sources; habitat, what's going on in the ocean, the ocean bycatch, which we still just don't have a grasp on with the available data, and how much it contributes to each of the individual stock that are overall mortality. Hopefully that was some good context, but let me know if that didn't fully answer your question.

MR. GARY: No, thank you, Jeff. I appreciate that. Then I don't know if we want to defer this to management responses, but I don't know if any of you can get your thoughts on the value of the fishery dependent collection of data that we have a pretty long series on now, and where you see that standing going forward.

DR. LIMBURG: If I can just jump in, I think any long-term data are important to have. We're facing the issue in the Hudson River system now that some long-term monitoring has ceased, and we are trying to reimagine ways of making it happen again and how that should be. I think you obviously can't see many phenomena if you don't have some kind of long-term data.

You know understanding some of the drivers on the data are very important, fisheries changes can be from behavior, for example changes in what people like to do, the gear that they use and so on. But I still think it's invaluable to have the data, just personally speaking.

MR. GARY: Thank you, Dr. Limburg, and thank you Mr. Chairman for that generous apportionment of time. Thank you.

CHAIR ARMSTRONG: Toni, I have Loren third, I missed the second hand up.

MS. KERNS: It's Justin Davis, and then after Loren will be Cheri Patterson.

CHAIR ARMSTRONG: Okay, Justin go ahead, Justin Davis.

DR. JUSTIN DAVIS: I'll just start by thanking Mike and Karin for a few excellent presentations this morning, and thanking the Stock Assessment Subcommittee for all the work that went into this document. I've got a two-part question that has to do with these terms sustainable versus unsustainable mortality, reference to the total mortality reference points.

I think those terms, sustainable or unsustainable. If you ask ten people, what does that mean? They would say sure, I know what that means, but then if you ask them to expound upon that you might get ten different answers. I wanted to provide how I'm interpreting those terms, and see if that matches with what the technical folks interpret it as.

I view the idea of unsustainable mortality here as meaning that the stock is experiencing a level of mortality that is preventing it from recovering to a level of abundance that would be typical of that stock, under sort of a baseline natural mortality level that is typical of, you know of fish of this life history and maximum age.

But I don't interpret it to mean unsustainable in the sense that we would expect sort of extirpation of local extinction of the stock, in some reasonable timeframe, 20 years, 50 years, and then also that level of mortality may not even lead to declines from where the stock is now. That the stock may be able to persist at this level of abundance, with maybe a truncated age structure at that level of mortality. I'm just looking for maybe a little clarification on the interpretation of those terms, sustainable versus unsustainable mortality. Then related to that, what was the rationale for changing the level of what was defined as unsustainable mortality in this assessment, making it more conservative relative to the past assessment?

CHAIR ARMSTRONG: Mike, could you answer that?

DR. BAILEY: Yes, I think for this one I'm going to pass it off to Jeff as well.

MR. KIPP: Thanks, Mike. Justin, I would say that your interpretation is correct. We chose a reference point based on the per-recruit analysis, so we're shooting for the D40 percent, or a mortality that gives us 40 percent of the spawners per recruit under that baseline sort of natural mortality you mentioned, based on the longevity of the species.

In theory, this species could stabilize at a lower abundance under higher mortality rates, so it doesn't necessarily mean the unsustainable doesn't necessarily mean that the stock is trending towards extirpation. I think the other question was, why we chose the Z40 percent changed relative to the last assessment of the Z30 percent.

The Stock Assessment Subcommittee did a review of the literature that are available on these per-recruit analyses, which are typically meta analyses on various stocks, and looking at sort of what that sweet spot in mortality is that you would want to shoot for. After that review, we felt that D40 was a more appropriate level.

It's a bit more conservative, and that is to note sort of the data uncertainties we're dealing with here, and just the uncertainty in this species being at such a low level, what the uncertainty is in those appropriate mortality levels. I think it is sort of nodding to the uncertainty here, and the precarious state we think a lot of these stocks are currently in, and that we think we should be shooting for something a bit more conservative than was being targeted in the last assessment.

DR. BAILEY: To add to that, I think some of that increased uncertainty comes from a better understanding of aging of the fish, and certainly we have a lot more quantitative data now that we can say, scale aging that was used in previous stock assessments probably was not nearly as accurate or precise as we thought it was.

DR. LIMBURG: That's kind of a little bit of a black art to age from scales, I think. I will say that some people are very good at aging with scales.

CHAIR ARMSTRONG: All right. Loren Lustig.

MR. LOREN W. LUSTIG: Thanks to Dr. Limburg for a very fascinating report. I really have two questions, and they relate to historic abundance. Predominantly I'm interested in the Susquehanna River. I was interested in the photograph that was shown of a commercial angler there with a small skiff, and these really large American shad.

My first question is, based upon my own recreational fishing in the lower Susquehanna, is the hickory shad that comes up just up the river, just before the American shad. Is the hickory shad a species that would have ever been commercially harvested? I'm interested in knowing if the population of hickory shad shows the same sorts of fluctuations, perhaps based upon riverine habitat quality as the American shad. If it does, then it would be perhaps data that we should consider as we move forward with our American shad assessment. Thank you.

DR. LIMBURG: I'm not sure who wants to take that.

CHAIR ARMSTRONG: Loren, who do you think should answer that?

MR. LUSTIG: Well, the person with the most knowledge. I would wonder if Dr. Limburg could comment about that.

DR. LIMBURG: Okay, I can say that I don't think there is a lot of fishing on hickory shad. I remember there was a guy, I think he was at Virginia Commonwealth University, who used to study them. He commented that they weren't very good eating, which surprised me. I've never tried them myself. I've only seen one hickory shad myself.

They are not as abundant up north as they are in kind of the Mid-Atlantic states, but they may come up of course with climate. I think what I know is that they are kind of recreationally angled. But I don't know how much they compete, for example, for habitat with American shad. I think again, I think there are a

lot of questions, a lot of just open unknowns about them. It's the fate, unfortunately of fish that don't produce as much income to be less studied, unfortunately.

CHAIR ARMSTRONG: Okay. Cheri Patterson, next question.

MS. PATTERSON: This was very informative. I really see a lot of work involvement here, and I am in awe of the work. Is it possible to go back to Dr. Limburg's presentation, where it shows the northward movement of shad stocks?

DR. LIMBURG: Yes. This is, if you can make my screen visible. I don't know if it is or not.

CHAIR ARMSTRONG: It's not yet.

MS. KERNS: Cheri, if you could ask your question and we'll get you there. It's just going to take us a couple of minutes, so if you could keep asking questions, just to keep us moving along.

MS. PATTERSON: Okay great, thanks.

CHAIR ARMSTONG: Do you really need that, Cheri? Could you work around it?

MS. PATTERSON: Well, I could try to work around it. My question has to do with, with this stock assessment was there any sort of analyses, and I'm sorry if I missed it, to move some of these datasets, or to think about moving some of these datasets northward? I believe in long term datasets; I think they are very important. But if they are showing some trends that are not easy to analyze, and it looks like there is a northward movement of this population. How is that going to be analyzed in the future, so that we're not necessarily looking at downward trends in all the wrong places that we might be literally following these species, as they are doing this northward movement? I'm just concerned about the habitat and life cycle stressors that might be affecting them in the Mid-Atlantic, further south and such, and we're not really capturing their northern movement into new habitats.

DR. LIMBURG: I can take a stab at that. Cheri, I think that was a great question. I think one of the big questions for me is, with regard to these alosine herrings that have very broad latitudinal ranges and site fidelity. We know that they establish these in genetically distinct spawning populations.

One of my questions is, are they, and you know we're only looking at a tiny, tiny moment in time over the course of their evolution, and they've been projected to massive glaciers, glaciation events, and probably warming events and hybridization, and very flexible fish evolutionarily. But the question I have in this particular moment is, are the populations just going to be winking out in the south, and enlarging, expanding to the north, or are we going to actually see hop scotch movement of populations from the south to the north?

That is the kind of question that can be addressed by genetic analysis, and I believe there is some of that work going to be started. I think it's one of the big questions for these fish. It matters, I think quite a lot. For example, if the hop scotch hypothesis is correct, then perhaps the reason why shad are just about gone in the Hudson might be because they moved north.

Maybe we have to wait until southern populations start to colonize. I have no idea, it's an open question. But I think we'll probably be approached to asking that, is to try to do the genetic work, is my guess. From otolith chemistry we can also identify populations. But I don't know that it would address exactly the questions that you're asking now.

CHAIR ARMSTRONG: Thank you, Karin. Mike Bailey, would you want to add to that?

DR. BAILEY: It's a hard question, and part of it is the latitudinal gradient of some of the life histories, and also some of the habitat, which more southern rivers typically have a dam much further, marked out much further. I think it's a good question, it's one to think about. She gave a great answer. I don't think we can do anything but make up stories right now.

It's something to consider though, with climate change and shifts; not only the freshwater shifts, but also the marine shifts. Right now, we are still a lot of open question to where are all these fish moving at sea. That may be a bigger factor, if fish from Florida have to add an extra 500 miles north in their oceanic journeys. Well that may make a much bigger difference than fish off the Merrimack River have to go. It's really a confounding question. There is a lot of interesting things to think about, but I don't think we have any solid answers.

CHAIR ARMSTRONG: Toni, more questions from the Board?

MS. KERNS: Yes, we have Bill Hyatt, Lynn Fegley, and Roy Miller, and Emerson Hasbrouck.

CHAIR ARMSTRONG: Okay, let me write those. Bill Hyatt, please.

MR. WILLIAM HYATT: One of the things that surprised me from this assessment was the fact that current fish passage only for about a 4 percent or so increase in potential spawning. That surprised me, because it seems that fish passage work is being done all over the place. I would have expected a much higher number.

One of the things that I'm wondering is if there was any assessment done on how much of that may be lack of (broken up word) due to inefficiency of existing fish passage facilities. How much that 4 percent number might be improved from technological fixes of the existing facilities.

DR. BAILEY: Thank you, Bill for that question, this is Mike Bailey. In the analysis we did for the coastwide stock assessment, we kept those passageways static. Most of this work was done by Dan Fitch from University of New York State College of Oneonta, and Joe Zydlewski from USGS. For different rivers they have worked with very similar models to look at different passage rates, and they do make a difference, especially adult bounds remigration.

For this coastwide model we kept it a bit more simple, and I think if we did increase that number of passage rates, we would see a greater increase. But we didn't run a sensitivity on that, at least that I have at my fingertips, to see how much that 4 percent could increase. For individual river models they have it, for this coastwide one I don't have it at my fingertips.

MR. HYATT: There is a potential there on the spawner side?

DR. BAILEY: Yes.

CHAIR ARMSTRONG: Lynn Fegley.

MS. LYNN FEGLEY: Thank you to the peer review, Dr. Limburg, and to the Stock Assessment Committee that is a phenomenal amount of work. My question is really basic. You know this species is so different than other species that we manage, where we have you know reference points, and we sort of understand what we need to do to manage fisheries relative to our reference points. Our action item today is to accept that assessment for management.

I'm trying to wrap my head around what that means. You know, so to Justin Davis' question about sustainability. It sounded like with the Z40 reference point it puts us in a place where we probably we wouldn't be rebuilding. Maybe we would be holding the population stable at this low level, but we would not be extirpating the population, although then we transition to climate change, and we talk about populations vanishing from areas to the south.

I guess my question is, basically what does it mean when we accept this for management, and what more could we possibly do? I love the habitat piece, because I think it gives us really a platform to work from with our partner agencies and other folks involved with habitat, as Dr. Limburg says. But I'm really trying to understand, if someone could help me. If we accept this for management, and we have a fishery that has unsustainable levels of mortality on adult fish. What does that mean?

CHAIR ARMSTRONG: Thank you, Lynn. It's such a great question. It really crystalizes a lot of why we're sitting here. It comes to, do we just want to hold in

place, or do we want to actually rebuild, which might be much stricter than what we're thinking about. Why don't we start with Mike Bailey?

DR. BAILEY: That's a hard question, and frankly my work is more focused on restoration, so I look at this stock assessment from one aspect, in which there should be a lot more shad out there. I'm not sure that is what everyone else thinks. I'm almost going to skip that question, because I think, well I guess that is a question for the Board.

Are we looking to rebuild shad stocks everywhere, or are we looking to rebuild shad stocks in some rivers, or are we just looking to have better data on those shad stocks? I think that is more of a question for the Board than for me. For me it's restoration. We need a lot more fish than we have now. We're way below where we should be, and that starts with habitat, in addition to the more restrictive catch measures that has already been. I think the missing piece now is focusing on habitat work and continuing on with those limits to fisheries.

MS. FEGLEY: Can I follow up on that real quick?

CHAIR ARMSTRONG: Sure.

MS. FEGLEY: To that point, does that imply that if you were to get that total mortality down below the 40 percent that you could begin rebuilding? I guess that is one of the things I'm trying to understand.

DR. BAILEY: Go ahead, Jeff Kipp. Maybe you can tackle that question better.

MR. KIPP: Yes, so the Z40 threshold is what we think is the appropriate level, and yet that should allow for rebuilding of these stocks, assuming that the juvenile mortality, so when these fish leave as young of year and then come back as spawners. Assuming that those mortality levels are sustainable as well, which right now we don't have the data to assess.

But in theory, that Z40 would allow for sufficient SSB per recruit to build these populations back to what we think are the optimal levels. I think we recognize the concern here about what do you do. It's a total mortality estimate, and again we don't partition these mortality estimates into their individual components, because we just don't have the data to do that.

One of the first things I think that came out of this assessment is again, to highlight that we need certain data components to be collected, most notably I think stock composition data from the ocean. There is bycatch going on, but we don't know how that bycatch is impacting these individual stocks.

It might be impacting some more than other, but we don't have the data to determine that now, because we don't know what the stock makeup is of that bycatch. I think data collection is one of the emphasis out of this, to get us to a place where we can better partition those mortality sources, and determine if fishing in a particular river is limiting the rebuilding of these stocks. I hope that helps address. But yes, it's a tough question when we don't know what the various factors are doing to these mortality rates.

DR. LIMBURG: If I may jump in also, just to say that yes, I think both Mike and Jeff are right. But remember that we're at such low levels of populations that a removal is proportionately more than it would be if the populations were really high. That is why we have to be cautious. Not saying to shut down fisheries, but I'm saying be cautious, and think about that.

I think it also gets at Mike's point of you know we need to tread on places that we normally haven't trampled, which is talking about opening up habitat. I've studied this myself in some of the rivers of the east coast. You know the biggest difference you could probably make is getting fish up the Susquehanna all the way.

You know taking down the Conowingo Dam. The passage doesn't work. I know Sheila Eyler is on this call, and we had discussions about this. They're doing truck and transfer now, but we know that the most effective way, if we really, really wanted to get fish up

and rebuild those populations there, it would be no dam.

That would be the way. The Susquehanna has other complications, it's got the Conowingo pool is full of sediments that the Chesapeake Bay Committee doesn't want to have rolling down into the Bay. It's got a lot of complicated things going on. But I think it could be managed, but it would take a lot of work and planning.

CHAIR ARMSTRONG: In front of Roy, who is next, hang on a second, Roy. Mike, are there empty rivers that could help build up the population by restoring runs? On the east coast to restore runs that we haven't done anything about?

DR. BAILEY: I think there are. I think some of those rivers are, we could take for example the Penobscot River, which the first dam ahead of tide wasn't passing any fish, so we didn't know what was below that river. I think there is probably a lot of population below low on rivers that are populations that still exist that we don't know anything about, because they don't pass. There are a lot of opportunities in those smaller systems.

CHAIR ARMSTRONG: Okay thank you. Roy Miller.

MR. ROY W. MILLER: Thank you also to Mike and Dr. Limburg, and to the stock assessment staff, and everyone who worked on this truly noteworthy assessment. My question, I'm going to apologize in advance, because I did loose Wi-Fi for about 30 minutes, and so if I repeat a question that has been asked and answered, I apologize. But I wanted to follow up on the question of Justin Davis, and also Lynn Fegley touched on the same thing, regarding these unsustainable populations.

I'm specifically referring to the Connecticut, the Delaware and the Potomac. Of those three obviously the Delaware is nearest and dearest to my heart, since I used to serve on the Delaware River Fishery Management Club for many, many years. But anyway, if the mortality is unsustainable, let's say in the Delaware, and the Delaware is essentially undammed, getting into the hundreds of miles upstream into the headwaters in New York state. We can ignore dams on the main stem, which is (broke up) compared to the Susquehanna. What can you do to turn that situation around regarding unsustainable mortality? In other words, would it be a waste of time to further restrict fishing mortality on the Delaware stock?

Would it be worthwhile to pursue that now greatly depressed fishing mortality over what it used to be many years ago, or at least at harvest, compared to what it was many years ago? Is it worth pursuing that last aspect of something we can control, namely fishing mortality versus other things as yet undefined? I'm curious what our two reviewers think about that particular question.

CHAIR ARMSTRONG: Great question. Mike, why don't you take a crack at it, then we'll let Karin.

DR. BAILEY: I will apologize for a second. You broke up a little bit there, but I think I got the base of the question. While the Delaware does not have a dam, it does have some water quality issues in some years that are really left undefined. We don't know that component of the degradation affects some of our adults spawners, including those fish that may be spawning and then leaving later in the year, when water quality is detrimental to health.

We don't have that answer. I think that comes down to when we get to a lot of river specific questions. We lose a lot of the specifics of the river and what's actually causing some things. The Delaware certainly we see fish went way, way further than what other rivers. We have to understand, those fish that are making its way up in the headwaters. Are they able to turn around and make it out of the river with the water quality as is?

I think with that I'll bump it to Karin, but realizing that it depends on what our whammy bar is. If our one whammy bar is fishing, then that is what we have to adjust. We want to list in that framework of our fishing. But our real answer may be something that

we don't necessarily have our hand on, which is some of that other mortality that I think classically how models work may be tied into fishing, but it's not fishing at all, it's more of an environmental factor. With that I'll let Karin take the microphone.

DR. LIMBURG: Okay, if I were to put on my hat and play John Waldman, John would say that the commercial fishery in the Delaware Bay should be looked at. He speaks from having studied the stock composition in the Delaware Bay commercial fishery. When he studied it, I think it was around 2010, 2011, something like that.

I think 40 some odd percent of the genetic composition of that stock was Hudson River origin. This also reminds me that this is another thing that might be driving the decline in the Hudson too. I noted in the Stock Assessment Report that there has been a follow-on study of the genetic composition of that fishery.

The proportion of Hudson River fish now is half of what it was when John studied it, so over something like maybe an eight-year time difference, there was a halving of the proportions in the Delaware. That could mean that the Delaware population has grown more, or it could mean that the Hudson population has shrunk. I think that it points to something that has got to be looked at more, in the case of the Delaware. I can't really comment on, I would have to go back and look at the statistics on the impact of recreational fishing versus the commercial fishing in the Bay. The recreational, correct me if I'm wrong, but I think a lot of it happens above the Bay, and the commercial mostly happens in the Bay, in that particular case.

MR. MILLER: Follow up, Mike?

CHAIR ARMSTRONG: Sure.

MR. MILLER: You are absolutely right, Dr. Limburg. That recreational fishery is primarily in the riverine portion, and much less so in the estuarine portion of the Delaware estuary. In fact, in the state of Delaware there is no main stem Delaware recreational fishery for American shad. That occurs quite a bit further upstream. In terms of the water quality. I would agree with Mike Bailey that that was a huge problem 30, 40 years ago. But I think we've come to grips with that problem over the years, and water quality is much less of an issue for the Delaware stock.

DR. LIMBURG: I agree.

MR. MILLER: In terms of Dr. Limburg's suggestion using John Waldman's data to look at commercial harvest in Delaware Bay. That is probably one of the few things that we could do, if we felt that that was potentially important. I'm not convinced that it is, but it's about all we can do to have any potential impact on that stock, but thank you for your thoughts on this.

DR. BAILEY: If I may add, I think there is some renewed focus on the Delaware. The questions maybe we're asking now or don't even need to ask now, by the time the next stock assessment comes up we may have a much better way to ask the right questions and get to the right answers.

CHAIR ARMSTRONG: Emerson Hasbrouck.

MR. EMERSON C. HASBROUCK: Thank you Doctors Dailey and Limburg for your excellent presentations. My question is sort of relative to the issue that Lynn raised, in terms of what we can do here, how we can use this for management. In the review it was mentioned that there are five stocks where there is sustainable adult mortality, one of which was the Hudson River.

But then the Hudson River is also listed as depleted, and one of the comments was that it was depleted due to recruitment failure. Two-part question, I guess. One is, do we know what is driving that recruitment failure in the Hudson River? The second part is, is there really any stock recruitment relationship for shad in general, or in the Hudson River specifically?

CHAIR ARMSTRONG: Mike, do you want to take a shot at that?

DR. BAILEY: I think it's that river is in Karin's backyard, and I'll bump it off to Karin or Jeff to answer those.

DR. LIMBURG: This is Fisheries Science 101, I guess. I'm in the spotlight or in the hot seat. I wish that Wes Eakin could chime in. I see it as a couple things, one is the possibility that the staff being so low as they are right now are being affected by that commercial fishery in the Delaware. That is one issue.

That is not really recruitment that is the adults, but they are not being caught in the Hudson because the fishery in the Hudson is closed. But fish don't respect our boundaries, of course. The other worry that I have is the juvenile mortality from predation, by and large. That's just not very well assessed, and I think the managers know it.

Again, it's just a question of how many hours in the day are there. This will be a great thing, again to sponsor some students to study, and get more of a handle on it. Students are relatively inexpensive, compared to staff. That is one issue. Then I think the third is the threat of climate change and increased storms.

That is maybe a little bit more long term, but I have a P.H.D. student now, Chris Knack, who suddenly realized that when he did his Masters, and then was going on for his P.H.D. he was collecting data for the P.H.D. during a double back-to-back hurricane, you know hurricane Irene on top of Tropical Storm Lee that were three weeks apart.

They basically, although they weren't expecting spawning shad, because it was in late fall. It ripped up the habitat so badly that there was essentially a recruitment failure of spawning year. As those phenomena happen, again it gets back to how do you make those, when we think about things like habitat restoration, how do you make habitat, not only great places for the young fish to grow, or fish to spawn, and then the nursery habitat.

But also, how do you make them resilient? It's not just shoreline resilience for people, it's also habitat resilience for the organisms that live in those ecosystems. Getting back to your question about sustainable mortality. My comment was, again I just think it's bumping along at very low levels right now.

MR. KIPP: This is Jeff. If I could just jump in and add a comment. I think that the Hudson is a prime example of the caveat we've included in this assessment, which is we don't know juvenile mortality levels. The mortality estimates that we've put forward in this assessment are solely from the adult fish that return as spawners, and the decline in that age structure when they return to their birth spawners.

There is this big gap between when these fish are young of year in the river, and we do have actually some young of year surveys. Then when they leave and go out to the ocean and stay in the ocean, aside from some that might return, as Dr. Limburg noted. We just don't know what the mortality levels are.

There could certainly still be factors that are leading to unsustainable juvenile mortality. Even when they do return as adults and experience sustainable mortality, they've already been impacted to a degree, to where they're not going to trend towards a rebuilding stock, because of that high juvenile mortality.

MR. HASBROUCK: Then relative to the Part B of my question then, Jeff, based on what you just said. Am I to assume then there really is no stock recruit relationship with shad?

MR. KIPP: It may just be that there is an additional factor that we don't know if it contributes to that stock recruit relationship. You know the young of year may actually be tied to the adults. Yes, I'm not sure if it's just something that impacts those young of year, and that it is suppressing them from increasing in their relative abundance. Yes, I'm not sure I have a better answer for you.

DR. LIMBURG: Emerson, I think that there is probably not enough contrast in the data now to see that, because the population is so depressed, I mean at least in the Hudson. If you wanted to establish a stock recruitment relationship you might be able to do it in the Columbia River, which has the world's largest

population of American shad, there are over 7 million there. It's a wonderful system, but it's not here, and they've got lots of shad out there.

CHAIR ARMSTRONG: We're way behind now. If we can get questions more towards whether we accept this as a package or not, the review and the assessment. In the coming meetings when we're talking about actions, and should we do it. I think we can get into the meat of it more.

These questions are important, and they are really good questions. But we're going to have to cut off questions in a little bit, and there are a couple of public comments we want to do. But back to the Board. We're discussing whether we should accept this. Toni, do we have more comments?

MS. KERNS: We do not have any more questions from the Board. We have three questions from the public that I'm aware of.

CHAIR ARMSTRONG: Okay, and we'll do that by hand raising.

MS. KERNS: The first one is George Jefferson.

CHAIR ARMSTRONG: Go ahead, George.

MR. GEORGE JEFFERSON: Hello Dr. Limburg, great presentation. You had mentioned the shad line in Delaware Bay, and I wanted to cite the Waldman et al 2014 paper. We know a mixed stock fishery exists in Delaware Bay, and we know the Hudson River shad are depleted.

Why isn't the line moved north to protect those shad of a mixed stock origin, or those with the Hudson River provenance? Then one more question if I may ask. With regard to the habitat model, looking at dams. The Hudson River didn't show so much impact from dams, but there was a 60 percent loss of shad spawning habitat to accommodate navigation. How is that accounted for?

CHAIR ARMSTRONG: Mike, do you want to try those? You know the first question was a management decision. Do you want to comment on that, Mike?

DR. BAILEY: The first one I will not comment on. I think there are other folks who could speak better to that. To the second question about the habitat model. The habitat model was based very much on dams and accessibility. In the write up, we did include some discussion about we're not talking about water quality. We know there have been a lot of changes to habitat, there has been a lot of changes to submerged aquatic vegetation.

Those weren't covered in this kind of big 40,000-foot new model. We do realize some river systems have habitat degradation that is not dam related, and we weren't able to get at that at a coastwide level, so we didn't get to it, then the write up should reflect that. For the first question I am not familiar enough with it, and I know there were decisions made that I had no part of. Maybe someone else could answer that better.

CHAIR ARMSTRONG: Well I think, George I don't think the person is sitting on a microphone right now who can answer that. But clearly there has been a lot of work since that line has been set in Delaware Bay. This may very well be part of an action that we can move forward over the next Board meeting or two, under the recommendation of the Technical Committee, which we will be discussing in a few minutes. I'll leave it at that. Next public, Toni.

MS. KERNS: We have Jim Cummins.

CHAIR ARMSTRONG: Go ahead, Jim.

MR. JIM CUMMINS: Thank you, Chairman, for letting me speak, and I want to also extend my thanks to the Committee and the Peer Review Team for an excellent job. I was involved in the 2000 assessment, I know it is a lot of work, and I really appreciate what they've done. A little background for the Board members. I'm a retired biologist, since 2016, but I have a 31-year career focused on fisheries management.

I started a DC Fisheries Program in 1985, which I luckily am probably the only living person that started such a jurisdictional program. Then from 1988 to

2016 I worked for the Interstate Commission on the Potomac, including working on shad restoration in the Potomac. I've done that since '95 onward.

I remember when the Potomac was really in bad shape. We were told we weren't even going to find enough shad to start Potomac origin fry upstream of a modified dam. We couldn't beg, borrow or steal any eggs from anybody else, until we went out in the river, I got a Virginia waterman to help me out, and we successfully had a restoration from 1995 to 2002.

Then the Potomac became the river of brood stock for the Susquehanna, for Maryland Rivers, and for the Rappahannock River. I've seen a river change from nothing to really good, and I have to disagree a little bit with the conclusions on Page 227 that the Potomac stock is currently experiencing unsustainable mortality.

I will agree there has been somewhat of an abundance plateau in the population over the last four or five years, but the longer-term trend over the last 25 years has been strongly upwards. I support the Peer Review Panel's recommendation that the data quality issues are such a concern that the output for the current model should not be used to provide estimates for management purposes. One other factor to consider is the ocean predation and bycatch mortality. Again, with the Potomac as a good example, it's pretty much it's an undammed river now. It's got good habitat. It should be really increasing a lot, but we've reached a plateau.

I think a lot of that is due more to what's going on in the ocean with predation. There are few rivers coastwide, sadly that are doing as well as the Potomac. When the Potomac population is out in the ocean they are being heavily preyed upon, and probably in the bycatch there is a disproportionate number of Potomac shad that are taken in the bycatch fisheries too.

Still for over 15 years in my annual reports on the shad project I noted that. You know in order for the Potomac or any shad population to do well, it's really reliant on the whole population of shad up and down the coast doing well, because we have such low numbers. They are being heavily preyed upon.

The importance of shad in restoring other fish could also be mentioned. I mean at one time when the shad were really abundant, and other fisheries were doing well. You know we don't have that any more, it's really impacting other fisheries. Spencer Baird mentioned in 1877 report that the demise they were seeing of the cod was linked to the lower numbers of shad and herring that were, because of the damming of the rivers at that time.

It's important to keep that in mind too. But I do think the Potomac model and these advancements are really great. I liked the report in general. I would mention that I think it is actually time to open up the recreational fishery in the Potomac, which has been closed since 1983. With the recreational fisheries closure, the attention and care for the fishery really went south.

Not only did the shad become very rare, it became the forgotten fish. I am an advocate for a very light reopening of the recreational fishing, which is primarily in the District of Colombia, and letting a few fish be taken by those anglers, to keep up the concern for the fish. That is about what I have to say.

The blue catfish, I have long worried about that, because I was witnessing the Maryland and Virginia folk coming out and collecting the blue catfish in the spring for their stomach content analysis, while we had four different agencies out collecting shad for brood stock. At the end of the evening, since there wasn't anything we could do with those squished up fish, we cut them up and threw them overboard.

Some of the data on the blue catfish consumption of shad, even though it's light, it might have been part of it could have been due to the availability of freshly killed shad. I mentioned to Marty that one of the potential management measures we could take is we currently have a 10 percent replacement stocking on all these programs that are taking fish out of the

Potomac for stocking in other rivers. We could increase that percentage to 15 or 25 percent, as a measure to help reduce the impact on the Potomac fishery. With that I'm finished. Again, I think the Potomac population is recovering. I thank you for this assessment, and for ongoing and future American shad restoration efforts, which are sorely needed. Thank you.

CHAIR ARMSTRONG: Any more public questions, Toni?

MS. KERNS: We have one last question from the public, Des Kahn.

MR. DESMOND M. KAHN: I appreciate the chance to pop this question. I'm going to start with a question, and then I'm going to give the rationale. The question is, when if ever will the Commission conduct a serious investigation of the predation impacts of our unprecedented abundance of striped bass on other fisheries, including primarily but not exclusively, shad and river herring? When will that happen?

The Commission has studiously ignored this question, and as an example, in the 2007 America shad assessment, two of the premier, actually the top experts in the world on American shad, which was Dr. Victor Crecco and Tom Savoy of the Connecticut DEP published more peer reviewed papers combined than anyone by far on American shad.

Submitted their report on the Connecticut River, and documented extensively how the formerly booming American shad and blueback herring run up the Connecticut River virtually declined and almost disappeared, at least in the case of herring, as stripe bass rebounded in the 1990s into the 2000s.

They submitted this report as the Connecticut Report. It was suppressed under the former director, it was suppressed. It was retained only as a minority report in the 2007 stock assessment. They have also published a peer reviewed paper to this effect. I believe it was in the Connecticut River (broke up).

Now, I believe to that assessment. Connecticut hired a team from the University of Connecticut to do a diet study on striped bass in the Connecticut River, and Justin Davis, who spoke earlier, was the primary person along with Eric Schultz. They documented by stomach content that the largest 10 percent of striped bass in the Connecticut River were eating adult shad in the spring.

The other 90 percent were eating herring, primarily blueback herring. Now, this does not talk about striped bass predation on juvenile shad. This is just on adults. After that, I was working in 2011 on the stock assessment of the Delaware River. I took Roy's former place on the Delaware River Official Wildlife Coop Committee.

I figured since they saw this in the Connecticut, I would look at the Delaware. I plotted the abundance indices of American shad in the river and striped bass in the waters of the Delaware. My jaw hit the floor. There was an unbelievable negative correlation between the two. In the eighties when bass were in the tanks, American shad in the Delaware River were booming.

Up in Pennsylvania, New Jersey there was a recreational fishery that was very strong. Hundreds of thousands of pounds of American shad were being landed by commercial fishers in Delaware Bay at the same time, and yet when striped bass increased in the nineties, that run declined. When bass peaked in the 2000s, American shad were so low that the managers were alarmed. Since then, when bass have declined some, being that the shad is going up. This chart is in an essay I submitted to the Striped Bass Board.

CHAIR ARMSTRONG: Dan, are you near the end? I'm going to have to stop you. You started with a question, which I imagine is rhetorical.

MR. KAHN: No, the question was. (broke up) That's my question. What?

CHAIR ARMSTRONG: As you well know, there isn't an answer. We don't know that. But we heard from both Karin and Mike time and time again what can be put in as environmental effects, and they talk about it. Your point is not lost at all. I don't think this is the

time, we don't have time to talk about it. But I appreciate you raising it, and it's absolutely an important point. Thank you, Des. Toni, are we done with the public?

MS. KERNS: We have one member of the public that had not asked a question yet, and now he has taken his hand down. There it is, his hand is back up. This would be the last question from the public. Seth Amgott.

CHAIR ARMSTRONG: I know this is probably about the Potomac. If it's redundant to what Jim's very eloquent talk, could you keep it may be very short, because we're really behind at this point?

MR. SETH AMGOTT: Yes, Mr. Chairman. Thank you for your time. I just wanted to thank the staff for tremendous and impressive work. I particularly appreciate highlighting Jeff Kipps work on the Potomac model, and highlighting the impact of the brood stock removals. It seems to me that advocates and anglers like myself have some work to do with our representatives on the Council in that regard, and making sure that those removal programs are the high-quality programs that they should be, given that they are accounting for mortality.

I do support a limited recreational harvest of American shad. We have work to do until DC and the PRFC come to you with that proposal. Until then, thank you very much for the assessment. I did promise to be brief. Thoreau wrote in 1845 of the effect of dams on the anadromous fish. Who hears the fishes when they cry? Thank you for hearing.

CONSIDER ACCEPTANCE OF BENCHMARK STOCK ASSESSMENT AND PEER REVIEW REPORT FOR MANAGEMENT USE

CHAIR ARMSTRONG: Going back to the Board. We're now considering acceptance of the assessment and the review, and we sort of meshed. The comments have been to that. We can take some more comments on the relative merits of accepting it or not. But I would like to get a motion if I could, to accept the assessment and the peer review for management use. Would someone like to make that motion?

MS. KERNS: You have Pat Keliher.

CHAIR ARMSTRONG: Pat, are you making that motion?

MR. PATRICK C. KELIHER: I would be happy to, Mr. Chairman. I would move that we accept the Benchmark Stock Assessment and Peer Review for management use.

CHAIR ARMSTRONG: Thank you, do we have a second?

MS. KERNS: You do, Cheri Patterson.

CHAIRAMN ARMSTRONG: Cheri Patterson seconds, excellent. Pat and Cheri, I'm guessing you don't need to justify why you did that. Any discussion on this? Any hands, Toni?

MS. KERNS: No hands.

CHAIR ARMSTRONG: No hands, so it would always be easier in this format to do it by consensus. Is there anyone who would vote against this, and do we need to caucus? Any hands, Toni?

MS. KERNS: No hands.

CHAIR ARMSTRONG: All right, seeing none I am going to declare this motion accepted by consensus. All right excellent, and thank you all involved, the Review Committee and the Assessment Committee, awesome work.

CONSIDER MANAGEMENT RESPONSE TO THE ASSESSMENT AND PEER REVIEW

CHAIR ARMSTRONG: We've got a lot of work to digest this and move on with the responses to it, which is the next agenda item. Clearly in my mind we don't have enough information, nor enough time to craft specific responses by this Board to what's in that.

What I would like to do is consider charging the Technical Committee with coming up with a suite of responses, and these could be for individual stocks that are not sustainable or depleted, or coastwide actions also that could relate to improving data collection, et cetera, et cetera. Caitlin, could you help me out here? Is that appropriate to charge the Technical Committee?

MS. KERNS: Mike, I just wanted to let you know Pat Keliher has his hand up.

CHAIR ARMSTRONG: Pat, would you like to weigh in?

MR. KELIHER: I agree, it is really tough at this late hour of the meeting to get into a lot of details, but I do think it would be appropriate to task the TC and the PDT with identifying potential paths forward. If it pleases the Chair, I would be happy to make that motion.

CHAIR ARMSTRONG: It pleases me immensely.

MR. KELIHER: With that, Mr. Chair, I would move to task the TC and the PDT with identifying for the Board potential paths forward, to improve shad stocks, given the results of the stock assessment.

MS. KERNS: I believe Emerson Hasbrouck is seconding that motion.

MR. HASBROUCK: Yes, I'll second it.

MS. MAYA DRZEWICKI: Could you repeat the motion, please?
MR. KELIHER: Sure, task the TC and the PDT with identifying for the Board potential paths forward to improve shad stocks, given the results of the stock assessment.

MS. DRZEWICKI: And who is the second?

CHAIR ARMSTRONG: Emerson, I believe. If not, he is now.

MR. HASBROUCK: Yes.

CHAIR ARMSTRONG: Would either of you like to comment?

MR. KELIHER: I think it's clear from the stock assessment there are a lot of areas of concerns as it pertains to this species. I certainly appreciated the fact that there is an emphasis on habitat, and the need to access habitat. That certainly has been our focus here in the state of Maine, and we're seeing the benefits of that work. I think it's time to kind of roll our sleeves up when it comes to the species, and really start to look at what we can do to make some additional changes going forward.

MS. KERNS: Mike, you have Emerson and then Roy Miller.

CHAIR ARMSTRONG: Okay, Emerson.

MR. HASBROUCK: I thought my hand was down. My hand was up to second the motion. I don't have anything to add beyond what Pat has already mentioned.

CHAIR ARMSTRONG: Roy Miller.

MR. MILLER: For the maker and seconder of the motion. I just wanted to clarify that that advice to the TC and PDT, is that with the assumption that they will be making river-specific recommendations for paths forward, rather than a generic list of things that can be done? Because the river-specific recommendations would be much more helpful, and that is sort of obvious, but I wanted to make sure that that was the intent of the maker of the motion.

CHAIR ARMSTRONG: I would think it is, but do you want to refine it to reflect that?

MR. KELIHER: That certainly was my intent, Mr. Chair, but I didn't go into that level of specificity, in case there are some other areas within management that need to be looked at, kind of from a regional aspect as well. I left it a little bit broad to give them some flexibility.

CHAIR ARMSTRONG: Sure.

MR. KELIHER: I completely agree with Roy's thinking around river specific. If we're not really having some detailed focused efforts on a river by river basis, we're never going to get to the point we need to with this species.

CHAIR ARMSTRONG: Right, but there also may be some coastwide things, you know like the need to move to otoliths and things like that we need to capture also. Toni, do you think this is specific enough? Toni and or Mike Bailey, or Caitlin.

MS. CAITLIN STARKS: Yes, this is Caitlin. I think that this is clear enough that the Technical Committee, so we normally don't have the PDT unless an action is initiated, so I guess you could start with the Technical Committee developing some recommendation, and depending on those recommendations move forward with a PDT looking at them. Does that sound appropriate?

CHAIR ARMSTRONG: We would have to meet again before we task the PDT, is that correct?

MS. KERNS: Correct. It would be TC and staff that you would identify potential paths forward, but usually just the TC. You broke up a little right there, Mike.

CHAIR ARMSTRONG: I said would it be better if Pat perfects this motion and gets rid of the PDT in it?

MR. KELIHER: Sure.
MS. KERNS: Maya, please delete and the PDT. Thank you.

CHAIR ARMSTRONG: The motion is, move to task the TC with identifying for the Board potential paths forward to improve shad stocks given the results of the stock assessment. I've heard that that is sufficient to cover Roy's concerns, and maybe some of my concerns, broad based things that we could conserve. Comments on the motion.

MS. KERNS: You have Lynn Fegley.

CHAIR ARMSTRONG: Lynn, go ahead.

MS. LYNN FEGLEY: I just wanted to clarify that this is different from the research recommendations that are thoroughly listed in the assessment reports. I don't know if this needs to be specified in the motion, but I'm assuming this is really paths forward, in terms of functional management items.

Rather than things that could be done to improve our state of knowledge, which is a path forward for improving the stocks. I just want to make sure we're delineating, kind of for the Technical Committee, sort of researched study work that needs to be done from a management path forward.

CHAIR ARMSTRONG: It's more complicated than it sounds. I think the former. This is, we're looking for management actions that need to be done, but I think if the TC identifies a research need, like all states move to using otoliths for aging. Then that could be put into an addendum or some sort of action as we see fit. I think it's geared, and staff can correct me. I think it's geared towards management actions that we can take to address issues in assessment. Does that answer your question, Lynn?

MS. FEGLEY: Yes, it does, thank you.

CHAIR ARMSTRONG: Any other hands, Toni?

MS. KERNS: Those were all your hands from the Board. There is one member of the public that has had their hand up.

CHAIR ARMSTRONG: Okay, I'm not going to take any public comment at this point. I think we're going to move to see if this is by consensus, we can approve this. Is anyone opposed to this motion?

MS. KERNS: I do not see any hands.

CHAIR ARMSTRONG: Seeing none, this motion passes by consensus. At this point, well we're scheduled for a break, and could we take a five minute, literally just five minutes for a biological break, and start again at 11:15.

MS. KERNS: Sounds good, Mike.

(Whereas a recess was taken.)

CONSIDER STATE PROPOSALS TO RESOLVE INCONSISTENCIES WITH AMENDMENTS 2 AND 3

CHAIR ARMSTRONG: Toni, are we ready to resume?

MS. KERNS: Sure are, thanks, Mike.

CHAIR ARMSTRONG: All right, looking at the radar image I see New Jersey and Delaware, you are in the belly of the beast right now. I think we've lost a few people off the line.

PRESENTATION OF STATE PROPOSALS AND TECHNICAL COMMITTEE RECOMMENDAITONS

CHAIR ARMSTRONG: The next is the Technical Committee Review of the State Proposals to Resolve Inconsistencies with Amendment 2 and 3, and that will be presented by Ken Sprankle, he's the TC Chair. Go ahead, Ken.

MR. KEN SPRANKLE: Okay, thank you, Mr. Chairman. Good morning everyone. This presentation this morning will be shared by Caitlin and myself. I'm going to start by covering the Board charges, the TCs work and approach on those, and the TCs recommendations. Caitlin will cover later on how the TC recommendations relate to the existing FMPs for both shad and river herring, to help with any discussion.

Our presentation is going to start with some background information; the TCs recommendations. Those had been presented originally back at the October 2019 Board meeting. We'll follow that by the TC review of the state proposals that were directed for development by the Board. Those are going to include plans for Maine, New Hampshire, the Delaware River Basin Cooperative, the state of Delaware, North Carolina, South Carolina, Georgia and Florida. We've got a lot to cover, we'll cover them quickly, but hopefully thoroughly. The Board can then decide on actions, and we'll end with remaining tasks for the TC. I'm just going to remind folks, as many are aware that both Amendments 2 and 3 require all states and jurisdictions to submit sustainable fish management plans for all systems that remain open to river herring and shad harvest, either recreational or commercial.

The catch and release fishing can be permitted on any river without an SFMP. In the amendments they state that specifically SFMPs must demonstrate fisheries are sustainable with quantifiable sustainability metrics and annual monitoring. Sustainability is defined as, will not diminish future stock reproduction and recruitment.

I want to also note that both amendments also describe an alternative management regime option that may be proposed for Board approval. That is further defined as, if the proposal has the same conservation values that the measures contained within the amendment. In October 2017, the TC identified inconsistencies between state management programs and FMP requirements for both Amendment 2 and 3.

The Board then tasked the TC to develop recommendations to address them. Some examples of these inconsistencies included tributaries or river systems that have SFMPs and monitoring, but where tributaries are not explicitly addressed. Second, rivers open to harvest in an SFMP, but with no monitoring to address sustainability, and lastly the third one, rivers open to harvest without an SFMP and/or monitoring, but where little to no harvest is suspected.

Again, in October 2019, the TC presented a report on these inconsistencies, and recommendations for resolving each issue. At that Board meeting the TC was requested to have the states submit proposals to resolve inconsistencies consistent with the TC recommendations. The TCs recommendations for these inconsistencies included three options

.

The first one I have shown here is catch and release only regulations. Those are for systems with no plans that appear to have the most clear-cut option, and it was also sustainable, of course. Catch and release regulations have been implemented by most states without SFMP metrics. Another option would be

application of sustainability metrics for monitored systems, and that is where sustainability metrics can be applied to a broader geographic area for unmonitored areas.

The Amendments speak to the fact that state wide and metrics may be used. Lastly, we have the alternative management regimes that I mentioned. The TC considered this option may be appropriate for systems with no known harvest. I'm going to review now some of the summarized elements of the proposed individual state plans.

The state of Maine has an existing approved river herring SFMP. The issue was the state wide 25 fish recreational bag limit, with limited monitoring. The state proposal includes updating the SFMP to manage all rivers in a region based on fish weight counts as a sustainability metric from five fishways across the state.

Those fishways include the first, these are all first. The Saco River, Androscoggin, Kennebec, Penobscot and St. Croix. For folks not familiar with Maine, that is spanning sort of south to north in a northward direction across their coastal river systems. The 25th percentile, the fishway count mean will be used for each fishway as a management benchmark trigger. That is for each fishway, with management actions applied on a regional basis, just based upon the geographic area located between neighboring monitored areas, if the metric falls under the 25th percentile for three consecutive years.

The mean annual count of all fishways will also be used, with the 25th percentile benchmark trigger, and that is also a three-year consecutive basis. If that was tripped that would cause a statewide management action. The TCs recommendation is support approval of this SFMP update.

The state of Maine currently has no approved SFMP for America shad. The issue is a statewide 2 fish recreational bag limit. The state has proposed a new American shad SFMP that will use statewide applied sustainability metrics based on annual fishway counts from five fishways, and also a JAI value for the Merrymeeting Bay.

Merrymeeting Bay covers Kennebec and Androscoggin, two major river systems flow into it. The five fishways that are used, also sorting out south to north will be the Saco, Androscoggin, Kennebec, Sebasticook, and the Penobscot Rivers. Again, the 25th percentile value from the data time series is going to serve as the trigger for the JAI, and also for the individual fishway annual passage counts.

Three consecutive years below the 25th percentile will trigger a management response. Because they have both fishway counts and the JAI, if only one of the data types, either JAI or one or more of the fish counts meet the trigger, the recreational limit would be reduced to 1 fish. If both the JAI and one or more fish ways are below the trigger for three consecutive years, then the action would be to move to catch and release only. The Technical Committee recommendation is support of approval of the new SFMP.

The state of New Hampshire has an approved river herring SFMP. The issue was a lack of monitoring on the Salmon Falls River. That is a shared waterbody with the state of Maine. The state has proposed to update the SFMP with language that identified the Salmon Falls River as included in the existing Great Day Sustainability Metric, with the same subsequent management actions applied based on triggers.

We're going to talk about those in a moment. The TC recommendation is support of approval of the updated SFMP. We also learned back in the early spring the state of New Hampshire had a concern with the compliance, based on their defined management action from a trigger sustainability metric.

The management threshold for their river herring SFMP is 75,450 river herring passed among their Great Bay monitored fishways. That was not reached in 2019, which should trigger a closure for 2020. Back in the spring the state provided the Board with a letter,

and also discussed with the TC the issues surrounding reaching that trigger.

Cheri Patterson, again submitted a letter, it's dated April 7, about how they fell under the three-year running average that would trigger the benchmark management action, and the issues associated with that. As I said, Mike Dionne, he's a TC member from New Hampshire, he met with the TC, and we discussed that there are several different causes for that, including some concerns with the multi-tool fish counter, low water temperatures, and a dam removal and habitat use occurring downstream of one of the fishways.

The New Hampshire River Herring Plan states that if the three-year running average benchmark of the Great Day Fishways fall below the threshold, they institute a fishery closure. In April that letter again requested the fishery remain open in 2020, given their explanation of the issues and plans to take steps to address them.

The TC recommendation based upon that original letter was to support the approach of requesting Board exemption from their SFMP benchmark trigger, given the variables impacting the counts in 2019 for the 2020 season. Now Caitlin and I also communicated with New Hampshire Fish and Game for an update, and Cheri Patterson has recently submitted a letter to the Board. That letter is dated 7/30, has not been reviewed by the TC.

The recent letter to the Board restates the request for the 2020 fishery to be open, with a planned closure for the fishery in 2021, due to the second year of being below their threshold trigger, based upon 2021 count data. The Delaware River Cooperative has an approved shad SFMP. The issue was tributaries that were not identified in the plan.

The Co-op plan has been revised to identify tidal reaches of rivers in both New Jersey and Delaware, and the Technical Committee recommendation is to support the proposed revision to clarify its system tributaries in the plan. The state of Delaware does not have a state-specific SFMP plan for shad.

They also have an issue with allowing recreational harvest in tributaries to the Chesapeake Bay. The Delaware proposal is to implement catch and release regulations for all Chesapeake Bay tributaries, which is expected to be processed by end of this calendar year. The TC recommendation is support approval with the regulatory changes consistent with Amendment 3. The state of North Carolina has an approved shad SFMP.

The issues were tributaries that are not included in the plan, and also no monitoring and no SFMP for the Little River, which is a shared waterbody with the state of South Carolina. The states revised their SFMP to identify, incorporate tributaries in the SFMP, and also include the Little River, stating that system will be managed consistent with the South Carolina SFMP that includes that system in the Winyah Bay for its sustainability metrics and management actions.

The TC recommendation is to support approval of the proposed SFMP update. The state of South Carolina has an approved river herring sustainable fish management plan. The issues for the river herring include tributaries of open systems not identified in the SFMP, and recreational harvest that is open in systems without an SFMP.

That includes the Little River, Wando, Ashely, the ACE Basin, Coosawhatchie, and the Savannah River. The state proposal is to update the SFMP to include the tributaries of monitored systems, and those include updates to all the tributaries of the Winyah Bay in the Santee-Cooper system are identified, and the Little River will utilize the PD metric and management response. In addition, the state proposes to use an alternative management plan for unmonitored systems that are open to recreational harvest. Those systems include the Wando, Ashely, ACE Basin, Coosawhatchie, and Savanna River.

I'm just going to note here that we have three South Carolina plans to summarize here, so the TC recommendations are going to follow after we cover

all of these. The South Carolina Alternative Management Plan includes the ACE Basin and the Coosawhatchie and Savannah Rivers. The plan describes that South Carolina is unaware of any recreational fishing for river herring in these systems,that includes using MRIP data.

Commercial fishing is not allowed in any of those waters. Their plan describes river herring as functionally absent in these areas, and provides data from fishery independent surveys that include two shad young of the year electrofishing surveys, that are annually conducted in both the Edisto and Savannah Rivers.

The plan notes that a total of 28 juvenile blueback herring have been collected over 10 years of these surveys. The plan also notes that Georgia DNR has a 10-year spring adult shad electrofishing survey that is conducted below the first barrier on the Savannah River that also supports their position.

Their plan includes changes to regulations or development of an SFMP. If any survey detects a positive recreational harvest for three consecutive years, positive was defined as the most conservative. That would just be a single observation for count. They also note the fishery independent and fishery dependent surveys are also planned to continue, and the annual survey results are to be reported in the annual compliance report.

Lastly, the state of South Carolina has an approved shad SFMP. The issue is that tributaries are monitored systems, and are not included in the SFMP. The state proposes to link tributaries to monitored systems with sustainability metrics, and the system definitions are consistent with those in the river herring SFMP.

The TC recommends supporting approval of all three South Carolina proposals, the River Herring SFMP Update, the River Herring Alternative Management Plan, and I'll remind you again that that includes the TC request that all available monitoring data mentioned in the plan are to be submitted annually with the compliance reports. Then lastly, it recommends approval of the Shad SFMP Update as well.

The state of Georgia has an approved shad SFMP. The issues are unmonitored river systems in the plan, and the sustainability metric for the Savannah River, which is no longer considered viable by Georgia. The Georgia SFMP proposal updates the tributaries that are covered by systems, and it also applies the Altamaha metric and benchmark to other systems with insufficient data, specifically the St. Mary and Satilla Rivers.

Only the Altamaha and Savannah River allow both recreational and commercial fisheries. The other systems are recreational only. The Savannah River has had its commercial shad fishery decline consistently, to the point where the use of commercial netters sustainability metric is unreliable. The Georgia proposal is to use an ongoing ten-year fishery independent spring electrofishing survey. For adult shad it's conducted below the Army Corp Bluff Lock and Dam facility. Georgia proposes to use the annual CPUE data, relative to a 25th percentile value for the data time series of benchmark trigger.

That would trigger management action if below for three consecutive years. The Altamaha sustainability measure is a Georgia fishery independent gillnet CPUE with a benchmark trigger of three consecutive years falling below the 25th percentile. The TC recommendation is to support approval. The state of Georgia has no SFMP for river herring.

Commercial fishing for river herring is not allowed, but recreational fishing is unregulated. The state proposes an alternative management plan for systems statewide that would maintain no commercial fishing, and for recreational fisheries to remain unregulated. State plan notes that there are no landings records for river herring, and there is no known directed recreational effort for river herring.

The plan describes river herring as functionally absent from systems, and provides data available from both fishery independent and fishery dependent surveys. In Amendment 2, under monitoring table

requirements, Table 15 and 16, it states; there are currently no known river herring populations in Georgia.

Should populations be established, the management board has the authority to require a fisheries independent monitoring program be implemented. That was from one of the tables, the other one of course would speak to fishery dependent monitoring. Some examples of some of the data that were cited included DNR annual creel surveys in the Altamaha, and that is a survey that is conducted from April through November that has shown no records for river herring harvest.

On the Ogeechee a creel survey is conducted every five years, and that occurs from February to June, also no records shown there. They've also looked at MRIP data that shows no harvest records as well. In terms of fishery independent data, that includes the Savannah River adult spring shad fishing survey I just mentioned.

That survey has produced a total of three reported river herring over the data time series. The plan also sites a spring electrofishing survey in the Ogeechee for adult shad. It has not observed any river herring. Other rivers in the state have rotational electrofishing surveys that have not observed any river herring.

They have juvenile index seine surveys for shad that are also conducted from July to September in the Ogeechee, Altamaha and Savannah River, and they've had limited river herring captures. Since 2011, a total of 13,300 juvenile shad have been collected in those surveys, with a total of 267 blueback herring captured in those surveys as well.

The proposal notes Georgia will continue with the described fishery independent and fishery dependent surveys, and they will provide data for monitoring in their annual compliance reports. If they detect any positive recreational harvest in any survey in any single year, they will investigate to see if additional data collection is warranted. If a positive harvest is detected for three consecutive years, Georgia will take steps to ensure sustainability for that river system. They note in the plan that no fishery independent data will be used at this time as part of their plan. The TC recommendation is support approval with annual monitoring data provided in compliance reports.

The state of Florida has a shad SFMP. The issue include that the tributaries of the St. Johns River were not identified. The St. Johns is the only system identified in the SFMP, although there are statewide Alosa recreational harvest regulations. The state proposed to update the shad SFMP and include the tributaries of the St. Johns, and a TC recommendation is support approval of this update.

Florida proposes an alternative management plan to address the potential recreational harvest of river herring statewide, and shad outside of the St. Johns River. The issue is again a statewide 10 fish recreational limit on Alosa species, with no SFMP for river herring or shad outside of the St. Johns River.

The proposal is an alternative management plan that will maintain existing regulations. The plan reviews the lack of any credible data reports for any river herring or shad harvest outside of the St. Johns River. There are also no fishery independent data to support river herring or shad occurrence outside of the St. Johns River Basin.

The alternative management plan will continue to examine and monitor both shad and river herring, both fishery independent and fishery dependent surveys in the St. Johns, and Florida will coordinate with Georgia for any survey data for the St. Mary's River, a shared water body. Florida will also monitor MRIP data for both species.

If any positive harvest detection occurs for three consecutive years, Florida will initiate a process to demonstrate sustainability for that system. If it cannot, regulatory changes will be enacted. The TC recommendation is support approval, and as with the other alternative management plans, any monitoring data for these species in any system will be provided annually in a compliance report. With that I'm going to let Caitlin take over, and she will cover these remaining slides.

MS. CAITLIN STARKS: Thanks, Ken. I switched the order of the slides a little bit from the overview, so sorry if that was confusing. But before we get into what the Board actions are to be considered today, I did want to go over what the TC is up to, in terms of developing recommendations for the remaining items from the original Board task related to improving Amendments 2 and 3, in the five areas that are listed on this slide.

The current plan is that the Technical Committee had formed a subgroup, which is a smaller task group that is focusing on developing draft recommendations, and they are continuing to meet, and will present those draft recommendations to the full TC. Then the TC will finalize recommendations to be presented to the Board at a future meeting. You'll note here that the *de minimis* issue is crossed off, because it's already been resolved. That was presented at the last meeting. Those remaining four items are what the TC will be developing recommendations are, in terms of potential modifications to the FMP to help with some of these issues. In terms of the Board action for consideration related to this agenda item. Today the Board may consider approval of the state proposals that were presented, and secondly consider approval of the request from New Hampshire for an exemption to their SFMP requirement to close their river herring fishery in 2020.

Despite having fallen below that sustainability threshold, which again they assert is due to technical issues with their fish count, and other explanatory variables, rather than true fish passage concerns. To help with the first Board action related to approving the state proposals. This table is summarizing all of the proposals that were submitted from each state that we've gone over today.

I highlighted in bold the proposals for the alternative management plans from South Carolina, Georgia, and Florida. Just because I think the Board may want to have as kind of separate, or focus discussion on these, since they're a bit different from what we are used to with the SFMPs. This is my last slide before questions and Board discussion.

But I think it would be helpful to give a reminder of what Amendment 2 provides, in terms of guidance on the alternative management regime for Alternative Management Plans. Amendment 2 says that these plans must demonstrate that the proposed management program will not contribute to overfishing of the resource, or inhibit restoration of the resource, and that they must show to the Board's satisfaction that the alternative proposal will have the same conservation value as the measures in Amendment 2.

That to me seems to reference the requirement to implement catch and release only regulations, in the absence of assisting a whole fishery management plan. When the Board is considering the three alternative plans today, I think an important question to keep in mind is, does the plan meet these two criteria or not. That is the end of our presentation, and Ken and I can take any questions.

CHAIR ARMSTRONG: Any questions from the Board, Toni?

MS. KERNS: None I see yet.

CHAIR ARMSTRONG: Based on Caitlin's advice, I think we probably have three motions we would like to make, just so we can have a little bit of discussion on each, and one is a motion to accept the sustainable fishery management plans and any amendments.

They made one motion to approve the alternative management plans, and then consider the request by New Hampshire separately, of which I think Cheri has a motion. Any broad questions? I don't think at this point any state has to defend what they've put out, unless they are attacked, of course, which you know may happen. Toni, seeing any questions?

MS. KERNS: No hands are raised.

CHAIR ARMSTRONG: Would someone like to make a motion to accept?

MS. KERNS: Chris Batsavage did just throw up his hand. I'm not sure if it's for a motion or a question.

CHAIR ARMSTRONG: I'm sorry, who was that?

MS. KERNS: Chris Batsavage.

CHAIR ARMSTRONG: Chris Batsavage, go ahead.

MR. CHRIS BATSAVAGE: Actually, a question on the Alternative Management Plans, questions for Ken. If I understand correctly, the South Carolina and Georgia mainly, and I guess Florida too will be looking at a recreational survey such as MRIP, and other creel surveys to detect any positive harvest over a three-year period, to see if they need action.

Was there any discussion by the TC over river herring being a very rare event species in any of these surveys, so they may not pick up any positive harvest, and also that MRIP doesn't cover the range of where river herring might be harvested by recreational fisheries in these rivers?

MR. SPRANKLE: Hi, thanks for your question. Yes, we certainly did discuss this thing. As you pointed out, the MRIP geographic range is limited to a couple areas. Folks are acutely aware of that. In terms of the recreational creel surveys, we didn't get into specifically what their creel clerks are asking.

I guess the assumption was that as a creel survey they would be detecting whatever was angled, what species were angled. You know again, the limitations of MRIP were understood, and then depending on which state you're talking about, there were other additional roving surveys that I mentioned for some of the states that occurred, that they felt would provide some ability to detect a positive occurrence.

CHAIR ARMSTRONG: Okay, does that answer your question, Chris?

MR. BATSAVAGE: Yes, that will work, thanks.

ADVISORY PANEL REPORT

MS. STARKS: This is Caitlin, I would just like to cut in one second, Mike. Before we take motions and we continue with questions, but **we do have an AP Report that needs to be presented, so just letting you know.**

CHAIR ARMSTRONG: All right, so why don't we move right into that.

MS. PAM LYONS GROMEN: Okay Caitlin, this is Pam. Should I go?

MS. STARKS: I think you're all set.

MS. GROMEN: Thank you, Mr. Chairman, members of the Board. It's a pleasure to be with you, albeit virtually. It's been a while since we've had an AP meeting, so I'm glad to present our report today. Our Advisory Panel met via webinar and conference call on April 8, to review the state proposals for resolving the inconsistencies with Amendments 2 and 3. Materials that we used for our meeting is we had a March 17 memo summarizing the state proposals, and the TC recommendations. Also, we were given well in advance of our webinar the proposals submitted by Maine, New Hampshire, Delaware, North Carolina, South Carolina, Georgia, and Florida, and we were sent those again electronically, so we had plenty of time to review those.

We had six AP members attend the webinar, representing Maine, Massachusetts, New York, New Jersey and North Carolina. I'll just say that six actually represents 50 percent of our AP membership, and so we do have some states where we do not have representation currently on the Advisory Panel.

Since I have the microphone, I'll just do a plug for getting some representatives to join our panel. Then the AP did provide comments on the individual state proposals, and also the TC recommendations regarding the additional improvements to the FMP. There was general agreement among the AP members to support the TC recommendations for approving both the state plans and the FMP. Seems to be somebody needing to mute there.

There was general agreement among the AP members to support the TC recommendations for improving both the state plans and the FMP as a whole. A question was raised about whether catch and release mortality rate estimates are available, as this is certainly important to consider if we're encouraging catch and release of recreational fisheries without a sustainable fishery management plan.

There was one member who expressed concern about the South Carolina plan, and why there was not data available in the proposal we saw after 2015. Since then there was additional communications that explained that that has to do with the sustainability metric that's used. We understood that, but just would have like to have seen more recent data.

Then for Georgia and Florida there was a concern raised by an AP member that the aggregate creel limits may pose issues, because the Alosa species are not easy to distinguish, and that education should be provided to anglers to differentiate between the species. The Alternative Management Plans or regimes, as discussed earlier they actually sparked a pretty robust discussion among our AP.

Again, these are alternative management programs are for rivers or river systems without a sustainable fishery management program. But they are not requiring catch and release for recreational fisheries. This is primarily for river herring. One member felt that rather than moratoriums for rivers without sustainable fishery management plans, a small personal harvest should be permitted for recreational fishermen.

Another member added that he would be in favor of this if it was biologically possible. Other AP members were concerned that the alternative management programs were not consistent with the goals of management, or fair to other states that have implemented required catch and release regulations, and as one member summarized, the idea of the fisheries being open, unmanaged, and uncounted seems problematic. Our AP member from New York relayed that fishermen in his state understood the closures, because they were concerned about the resource. There is a need to rebuild before we consider how many fish people should be allowed to take. Our AP member from Maine explained how they are leveraging the desire of some communities to take fish in order to restore the resource. He said the TC could recommend that some fisheries be reopened if more data is collected, and that this could fill data gaps along the coast. This led to just some general overarching comments. There is a connection between personal harvest and stewardship that should be recognized, and this was a big theme of our discussion.

Historically, shad and river herring were culturally important, and people took care of their runs, because the runs generated food, jobs, and revenue for the towns. The generation that used to eat river herring is dying out, and the focus has shifted to protecting river herring as part of the food chain for other species, and that it's certainly recognized as an important benefit.

But I think the point was made, because it's a more removed benefit than the personal experience of capturing a fish and handling it. Then our goals should be to bring river herring and shad populations back to a place where they can be harvested and serve their role in the ecosystem. The ASMFC has a duty to incentivize more data collection for river herring, and reconnect people with fish through education and citizen science.

Then finally, additional guidance on the Alternative Management Plans could be more specific on incentivizing data collection, in exchange for providing for a low level of personal harvest. I believe that concludes our comments from the AP. I would just mention that our full report is behind the supplemental materials.

CHAIR ARMSTRONG: Thank you, Pam. Are there any questions from the Board for Pam? Toni, any hands?

MS. KERNS: No, no questions yet.

MS. STARKS: I see Emerson's hand up, or maybe not anymore.

CHAIR ARMSTRONG: Emerson, did you have a comment?

MR. HASBROUCK: I was going to make a motion to accept the management plans when you're ready for that motion.

CHAIR ARMSTRONG: Okay. Caitlin, the motion that started to be up there. Would that cover the Alternative Plans and the Sustainable Fishery Plans?

CONSIDER APPROVAL OF STATE PROPOSALS

MS. STARKS: I think it would need to be made a little more specific, if you wanted it to only cover the SFMP and state proposals that were not Alternative Plans. This I think could cover all of them. If there is a desire to do that separately, I think that this would have to be modified.

CHAIR ARMSTRONG: Why don't we leave it broad? I think New Hampshire will handle separately, so this includes the Alternative Plans and the SFMP modifications. Would anyone like to make that motion for discussion?

MS. KERNS: Lynn Fegley has her hand raised.

CHAIR ARMSTRONG: Lynn, you are making that motion, thank you Lynn Fegley.

MS. KERNS: And Spud Woodward has his hand up as the seconder, I believe.

CHAIR ARMSTRONG: Excellent, seconded by Spud Woodward. Then Emerson I think has his hand up for a question, maybe, or a comment?

CHAIR ARMSTRONG: Okay, go ahead.

MR. HASBROUCK: No, I had my hand up, and as I mentioned before, I was ready to make that motion when the Chair was ready.

CHAIR ARMSTRONG: Right, I'm sorry.

MR. HASBROUCK: It's already been made and seconded, so I'm fine.

CHAIR ARMSTRONG: That's my fault, Emerson. Anyway, any discussion, would Lynn or Spud need to say anything about this?

MS. FEGLEY: No discussion from me, thank you.

MS. KERNS: You do have Chris Batsavage.

CHAIR ARMSTRONG: Chris Batsavage, go ahead.

MR. BATSAVAGE: Yes, I think I could support the motion for approving all of these. I just want to raise my concerns for just how the Alternative Management Plans, a plan is written in the amendment. I think the AP brought up some good points, as far as it's not really a level playing field for states that have SFMPs, and do the monitoring to make sure their fisheries are sustainable, and don't open fisheries that they don't have the available data.

It almost incentivizes states not to collect as much information, quite frankly. When you consider that river herring is always just a few steps away from potentially being listed as threatened or endangered on the endangered species list, I think I would hope that the TC and PDT works to kind of firm up what is allowed in alternative management plans in the future. Thanks.

CHAIR ARMSTRONG: Thank you, Chris, good comment. Any other comments?

MS. KERNS: We have Megan Ware, and then Emerson, your hand is still up, so I'm not sure if that is left over from before or not.

CHAIR ARMSTRONG: Megan, go ahead.

MS. MEGAN WARE: I think it would just be helpful for me if one of the states with the Adaptive Management Plans could just speak a little bit to the development of that and why they didn't go with catch and release. I mean if there doesn't appear to be recreational harvest now, I'm just trying to understand the state's thought process. I think that might be helpful.

MS. KERNS: You have Spud Woodward with his hand up, Mr. Chairman.

CHAIR ARMSTRONG: Go ahead, Spud.

MR. A.G. "SPUD" WOODWARD: Yes, I can speak to Georgia's approach on this. You know I've said this before in Board meetings that when we go, the four decision making bodies at our respective states and do things on behalf of the Commission. It's always important that they see the necessity and legitimacy of doing it.

If we were to request our Board of Natural Resources to promulgate catch and release regulations for a species that is functionally absent from a river system, then it calls the question, some of what we can do as a Commission. We feel confident that we have data collection processes in place that are going to detect the occurrence of these species, if they do become something other than functionally absent.

We think we're consistent with the spirit of the plan and the intent of the plan, to make sure that we do adequately manage river herring if they do occur with any frequency and abundance, that we will catch that in our data collection process. We have roving crew surveys independent of MRIP, so we're covering the possible range of distribution of these species in these river systems. That is just the Georgia perspective.

CHAIR ARMSTRONG: Thank you, Spud, are there any other Alternative Plans who would want to comment?

MS. KERNS: I don't see any hands raised.

CHAIR ARMSTRONG: Any other questions, comments on the motion?

MS. KERNS: I do not see any hands.

CHAIR ARMSTRONG: All right, again we'll try for consensus. Are there any no votes?

MS. KERNS: I don't see any hands for no votes.

CHAIR ARMSTRONG: All right, seeing none, you will consider the motion passed by consensus. I think we need to address New Hampshire's exemption, Cheri, do you have a motion?

MS. PATTERSON: Yes, I do, thank you. Can you bring it up, Maya? I move to approve New Hampshire's request for an exemption for their river herring SFMP requirement to close the fishery in 2020 based on data indicating that passage counts for the most recent three-year average did not meet the sustainability target of 72,450 fish. This exemption is based on explanatory information supporting the claim that passage counts are low due to equipment failure and other variables, rather than true fish passage numbers. If I can get a second, I can delve into that further.

CHAIR ARMSTRONG: Is there a second?

MS. KERNS: We have Roy Miller.

CHAIR ARMSTRONG: We have a second by Roy Miller.

MS. PATTERSON: Thank you, Roy. We have been struggling with a couple of our fish passage places in two river systems. One of them we've been trying to modify, in order to address a hydro development facility that continually adjusts the impoundment levels. So far that is not working out really well.

We thought we had it resolved this spring, but due to the flows that really didn't come through this spring, the modifications we made still were not passing the amount of fish that we should be passing in the Cocheco. As for our second river system, we had a dam removal project there, and we were hoping to continue to monitor the fish passage at the next dam and fish ladder.

However, it seems as though the fish that are bypassing, or going through the former dam site are not making it up to the other fish ladder, they're dropping out and doing their spawning below that. We're not getting a really good count of what is going past that former dam site that had a fish ladder where we were accounting for those fish in that river system.

The 2020, we had moved this past the TC. They agreed that due to circumstances that they were okay with us not closing the fishery in 2020.

It so happens that it's a moot point now. We didn't close the fishery in 2020. The fishery is done, it pretty much goes from April through June. But based on us still running into problems with these two river systems, and our fish passage counts are still below the sustainability target that we will be closing our season in 2021, in order to be able to thoroughly address our concerns, and get fish up into these system that are low producing at this point in time. Does anybody have any questions?

CHAIR ARMSTRONG: Questions for Cheri, comments. I assume there are none.

MS. FEGLEY: Mr. Chairman, this is Lynn Fegley. I raised my hand. I do have a question.

CHAIR ARMSTRONG: Oh, Toni is completely dropping the ball, sorry. Go ahead, Lynn.

MS. FEGLEY: No, that is fine. Cheri, just so that I'm clear and I didn't miss it. The 2020 fishery, which is what this motion is about is already essentially over, and you are planning on closing the fishery in 2021. Is that correct?

MS. PATTERSON: That is correct.

MS. FEGLEY: Awesome, thank you.

CHAIR ARMSTRONG: I guess we'll move the motion. We'll try to do it by consensus. Are there any objections to the motion?

MS. KERNS: I do not see any hand raised in objection.

CHAIR ARMSTRONG: Thank you, then the motion passes by consensus.

MS. PATTERSON: Thank you very much.

CHAIR ARMSTRONG: I think we have the major items done. We just have a couple of short updates and elect a Vice-Chair. We're going to stay the course. It will probably take ten or fifteen more minutes. Thank you for all your forbearance.

UPDATE ON RIVER HERRING TECHNICAL EXPERT WORK GROUP ACTIVITIES

CHAIR ARMSTRONG: Caitlin, could you update us on the TEWG?

MS. STARKS: Yes, I can. Can everyone see my screen now?

CHAIR ARMSTRONG: Yes.

MS. STARKS: These will be very fast, I just have one quick update on the TEWG, well two quick updates on the TEWG, and then a quick update on Shad Habitat Management Plan. For the TEWG, I just want to give a little bit of background, since you haven't discussed it in a while. But this group was formed in 2014, as a joint effort between NOAA Fisheries and ASMFC, and it was kind of in response to the 2013 determination that was seeing river herring under the ESA was not warranted.

When that determination was made, the two bodies agreed to develop a long-term dynamic conservation plan for river herring, and formed the TEWG with the purpose of informing that conservation plan, and identifying the critical data gaps and research needs that are hindering river herring recovery.

The TEWG produced a few white papers, focusing on different areas like river herring genetics, climate change impacts, fisheries, et cetera, and those were supposed to serve as the foundation for the conservation plan. That plan was considered completed in 2015, but it didn't exactly realize what the vision was, which was kind of a comprehensive document synthesizing all of that information into one place.

After producing those white papers, which were put online on a web format, the TEWG working group and subgroup kind of stalled, without having a real clear purpose or deliverable to produce. But the group as a

whole has continued meeting twice a year, and these meetings have kind of transitioned from a work focus to more of an information exchange format among river herring experts. Over the last several meetings we've gotten a sense from the participants that there is still an interest in having a more actionable document to guide river herring conservation efforts along the coast. Fortunately, NOAA Fisheries has recently secured some funding to have a contractor go back and try to update and rework that conservation plan from 2015 into something more comprehensive and informative to managers. NOAA Fisheries has outlined the scope of work for this contract, which is supposed to start in early 2021. The project is expected to produce something like that comprehensive document that provides a framework, goals and objectives, for river herring restoration throughout their range, based on expert opinions.

I guess now is a good time to note that we're trying to move away from calling it a conservation plan, because the document would not be requiring the states or NOAA to implement any actions, but would rather provide managers with updated information on the current threats, existing federal and state management actions, data and research needs, and expert recommendations for conservation and restoration efforts aimed at river herring recovery.

In general, the goal of this document would be to promote collaboration of river herring practitioners from different fields, support priority setting, and provide recommended actions for conservation and restoration of river herring throughout the range. That is an update on TEWG work, and then another update is that the coordinators being Sean McDermott from NOAA Fisheries and myself, have discussed changing the name of the group to better reflect the change in function from that workgroup format to more of an information exchange format.

We've had good attendance and positive feedback from participants on this new meeting format, as well as the potential name change. After discussing a few options, we're focusing on the name Atlantic Coast River Herring Collaborative Forum or River Herring Forum for short. Today I just wanted to get the Board's feedback on these two updates, and determine if there is general agreement among the Board members on the focus of the contract work that I described, and the potential renaming of the TEWG.

I'm happy to take questions and comments at this meeting, or I could also have follow-up e-mails if Board members have additional thoughts they would like to add or would like more information on either of these things. I also think NOAA staff discussing with them, they would be open to having a more detailed discussion on the focus and product of the contract work at a future meeting, if there is a desire from the Board. With that I guess I will open it up for questions or any quick comments that folks might have.

CHAIR ARMSTRONG: Questions or comments for Caitlin, keeping in mind that there can be follow up conversations also.

MS. KERNS: Mike, I do not see any hands raised.

UPDATE ON TIMELINE FOR SHAD HABITAT PLAN UPDATES

CHAIR ARMSTRONG: Seeing that let's move on. Caitlin, can you talk about the Shad Habitat Plan Timeline? UPDATE

MS. STARKS: Yes. This update is about those American shad habitat plans, which I'll just remind you are required under Amendment 3. All states and jurisdictions must submit a habitat plan for American shad, and we discussed this at the last meeting in February, and the Board asked the states to update those habitat plans, since it's been about five years since they were originally submitted.

With the exception of the Merrimack and Hudson Rivers, these were just the updates to the information that has already been put together, but the Merrimack and Hudson Rivers do not have

management plans currently. The states did begin the process of reviewing those plans earlier this year.

However, as you can imagine with everything going on in the world right now, and COVID-19, many of the TC members have indicated to me that they have encountered delays, and it's unlikely that any states will be able to complete updates of their plans in time for the October, 2020 meeting.

Considering that, my recommendation is that the states should aim to update their plans and submit new plans for the Hudson and Merrimack in time for consideration at the winter 2021 ASMFC meeting. If the Board is okay with that plan, we would expect the states to submit plans to the TC for review in December at the latest, so that the Board could then consider them in February. That is all I have on that issue.

CHAIR ARMSTRONG: All right. We could do a motion on this to allow extra time, I don't think we need to. I think just a head nod would be okay, given the circumstances. Does anyone have any heartburn with extending the timeline a little bit for the completion of the habitat plans?

MS. KERNS: We have Bill Hyatt with his hand up.

CHAIR ARMSTRONG: Go ahead, Bill.

MR. HYATT: No heartburn, this is just a real quick question. I was just wondering if these habitat plans include passage, dam removals, those types of items, if that is part of what is included.

MS. STARKS: Yes. I can send around an outline, but the information is in Amendment 3, and it does include things like restoration efforts, dam removals, passage, additions, and things like that. We would want to get updates from the states on additional projects that have gone on during the last five years since these were implemented, state plans were implemented.

MR. HYATT: Very good, thank you.

CHAIR ARMSTRONG: Okay, any other comments?

MS. KERNS: I do not see any other hands raised, Mike, and I agree we don't need a motion to delay.

CHAIR ARMSTRONG: All right, we will consider that a group nod, and we'll see those plans in January, I guess.

ELECT VICE-CHAIR

CHAIR ARMSTRONG: All right, we have one remaining item, well two with Other Business. We need to elect a Vice-Chair, a critical action. Would anyone like to make a motion to nominate someone?

MS. KERNS: We have Ray Kane.
CHAIR ARMSTRONG: Ray Kane, go ahead, please.

MR. RAYMOND W. KANE: I would like to nominate Dr. Justin Davis from the state of Connecticut as Vice-Chair.

CHAIR ARMSTRONG: Thank you for that motion, do we have a seconder?

MS. KERNS: Dennis Abbott.

CHAIR ARMSTRONG: Thank you, Dennis, seconded by Dennis Abbott. Is there any discussion?

MS. KERNS: No hands.

CHAIR ARMSTRONG: Seeing none, the motion carries by consensus. Congratulations, Justin. Which brings us to Other Business. Does anyone have any other business?

MS. KERNS: I do not see any hands.

ADJOURNMENT

CHAIR ARMSTRONG: Again, I really want to thank the Stock Assessment Committee and the Review Committee. That was an awesome job, and you've

got a lot to do. The stocks still remain in pretty tough shape, so with that we'll look for the future and this meeting is adjourned.

(Whereupon the meeting ended at 12:23 p.m. on August 4, 2020)